Long-Term Pavement Performance

LTPP Southern Regional Office - 8240 Mopac, Suite 220 - Austin, Texas 78759 - Tel 512-346-0870 - Fax 512-346-8750

31 July 2000

Mr. Jack Springer
Pavement Performance Division - LTPP (HNR-40)
Federal Highway Administration
Turner-Fairbanks Highway Research Center
6300 Georgetown Pike, Room F-215
McLean, Virginia 22101

Subject: Final Report - Construction of SPS-8 Project (48A8) on FM-2670 Eastbound in Bell County, Texas

Dear Jack,

Enclosed is the Final Report for the Specific Pavement Studies (SPS-8) project on FM-2670 Eastbound in Bell County, Texas. This report documents the construction of the Environmental Study test sections at this location, as well as the monitoring of the project to date.

Please feel free to contact me should you have any questions or comments regarding any of the information included in this report.

Sincerely,

Michael J. Harrell

Michael J. Harrell, EIT
Graduate Engineer, SRCO

MJH:dmj

Enclosure: 48A8 Final Report (w/DR)

c.w/Enc: Billy Pigg, TxDOT/Waco District
Ali Bashi, TxDOT/Belton
Debbie Walker, TxDOT/Austin (5)
Luis Rodriguez, FHWA-SRC/Atlanta (w/DR)
Gonzalo Rada, LAW PCS-MD (w/DR)
Jerry Daleiden, SRCO (w/DR)
Mark Gardner/Tim Martin, SRCO/File:48A8FR (w/DR)
Library

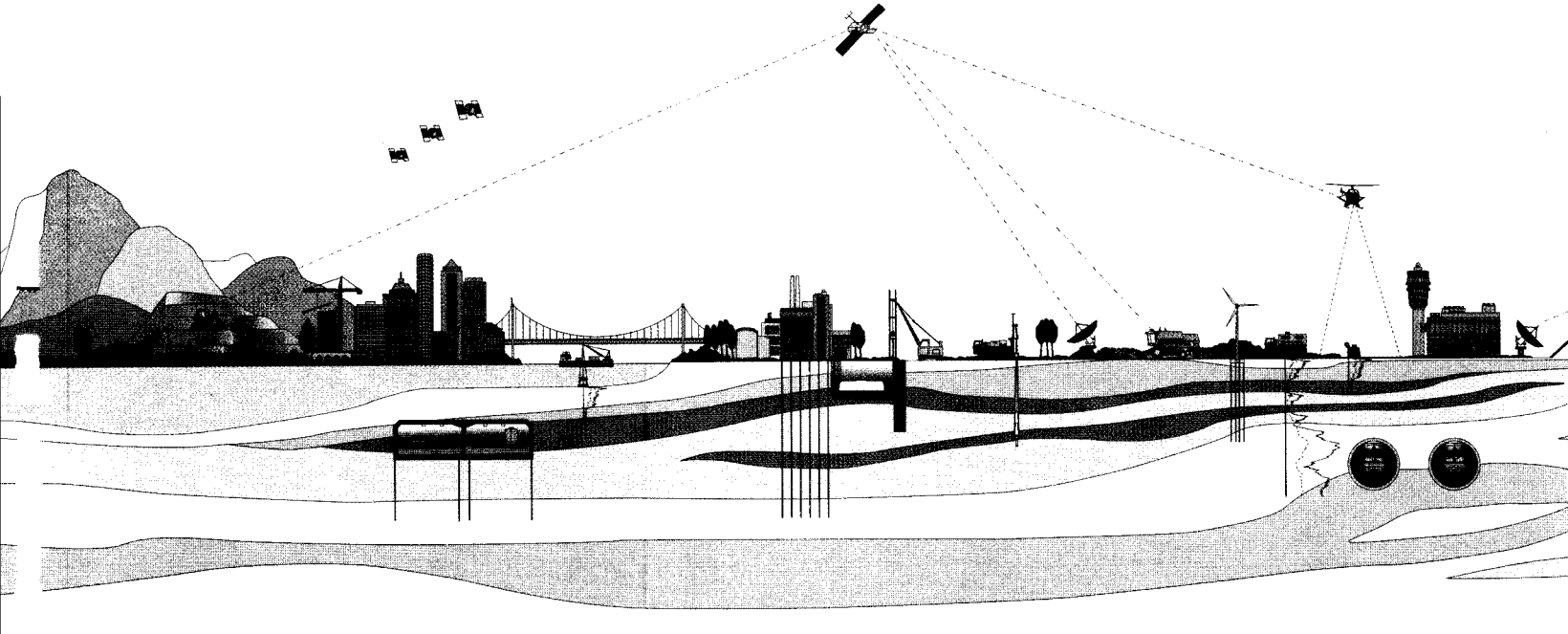
FUGRO-BRE, INC.

FINAL REPORT

SPS-8 PROJECT 48A8
ENVIRONMENTAL EFFECTS IN THE ABSENCE OF HEAVY LOADS
FM-2670, EASTBOUND
BELL COUNTY, TEXAS

FHWA/LTPP
SOUTHERN REGION COORDINATION OFFICE

July 2000



FINAL REPORT

SPS-8 PROJECT 48A8
ENVIRONMENTAL EFFECTS IN THE ABSENCE OF HEAVY LOADS
FM-2670, EASTBOUND
BELL COUNTY, TEXAS

FHWA/LTPP
SOUTHERN REGION COORDINATION OFFICE

July 2000

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FINAL REPORT - SPS-8 PROJECT 48A8

STUDY OF ENVIRONMENTAL EFFECTS IN THE ABSENCE OF HEAVY LOADS FM-2670, EASTBOUND BELL COUNTY, TEXAS

INTRODUCTION

The Strategic Highway Research Program (SHRP), in conjunction with the Federal Highway Administration (FHWA), developed the Long Term Pavement Performance (LTPP) program. As part of this program, sections of roadway are being selected to apply very specific treatments to study various facets of construction (both new and rehabilitation). These projects are referred to as Specific Pavement Studies (SPS). This particular project, on FM-2670 in Bell County, Texas was identified as a potential candidate for inclusion in the Study of Environmental Effects in the Absence of Heavy Loads (SPS-8).

SPS-8 General Experiment Design

The specific products of the SPS-8 Experiment are included in table 1. In general, the experiment is intended to validate and/or improve the environmental effects models and in turn improve on the design of pavement structures in all environmental conditions.

Table 1. Key Products of SPS-8

1. Evaluation of existing environmental effects (damage) models.
2. Determination of the effects of specific design features, thickness and pavement type, on pavement performance in the absence of heavy loads.
3. Development of a comprehensive data base for use by state and provincial engineers and other researchers for evaluating environmental effects on pavement performance.

Although the General Pavement Studies (GPS) sections provided valuable and timely information, controlled Specific Pavement Studies of newly constructed and reconstructed or rehabilitated (resurfaced) pavement sections are needed to provide an accurate estimate of the relative influence of key pavement elements that affect pavement performance. The importance of this experiment is highlighted by its ability to evaluate the interaction of traffic, structural parameters and climatic factors on pavement performance in a controlled manner.

SPS-8 test sites can include two flexible or two rigid sections with varying structural sections (or two of each if the participating agency is willing). As shown in table 2, the sections are to be built with specific pavement structures in a variety of environmental conditions to assess their impact on pavement performance.

For additional information on the general experimental design for SPS-8, please refer to "Specific Pavement Studies: Experimental Design and Research Plans for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads, August 1991."

Selection/Nomination of FM-2670

After reviewing the details provided by the state on this project, and preparation of a tentative layout of the test sections (to ensure that adequate space was available for such a project), the project was officially nominated on 23 July 1997. Appendix A contains the nomination forms which provide information on the project location, significant dates, traffic information and the agency's pavement structural design for the project in question. The section was officially approved for construction by the FHWA/LTPP Division 25 September 1997. The project was let for construction by the State of Texas on 18 May 1998.

Specific Experiment Design for FM-2670

Plans for this project were prepared by the Texas Department of Transportation (TxDOT). The typical sections for this particular project are included as figure 1. Section 48A807 is represented by the center typical section (200 mm PCC surface) and 48A808 is represented by the lower typical section (280 mm PCC surface).

The subgrade for this project is the same material that served as subgrade for the existing pavement structure, clay with gravel. The state elected to build two rigid sections with this project. Figure 2 shows the expected elevation view for this project.

PRECONSTRUCTION MONITORING

Because of the nature of this particular experiment (being new construction), monitoring of preconstruction pavement surface distress and structural capacity were not required. The primary preconstruction monitoring included rod and level measurements made immediately prior to construction (see appendix B) to evaluate variability in the thicknesses of each layer placed, and extensive material sampling and testing to document the material properties for each of the layers incorporated in these test sections. As specified for all SHRP test sections, a thorough Material Sampling and Testing Plan (MST Plan) was established for these test sections (see appendix C). Preconstruction sampling focused on collection of bulk samples from each of the various pavement layers. All subgrade sampling and testing was conducted in mid-November 1999 (see table 3).

Revisions in the MST Plan have been made and are included in this report to indicate the changes in sampling and testing.

Table 2. Experimental Design for SPS-8, Study of Environmental Effects in the Absence of Heavy Loads

PAVEMENT STRUCTURE [1,2]			FACTORS FOR MOISTURE, TEMPERATURE, AND SUBGRADE TYPE [3]																					
			WET										DRY											
Type	Surface Thickness in.	Base Thickness in.	FREEZE						NO-FREEZE						FREEZE						NO-FREEZE					
			Active		Fine		Coarse		Active		Fine		Coarse		Active		Fine		Coarse		Active		Fine		Coarse	
FLEXIBLE	4	6	X		X		X		X		X		X		X		X		X		X		X		X	
	7	12	X		X		X		X		X		X		X		X		X		X		X		X	
RIGID	8	6		X		X		X		X		X		X		X		X		X		X		X		X
	11	6		X		X		X		X		X		X		X		X		X		X		X		X

Notes:
1. Dense-graded HMAC and jointed plain concrete (JPC) for flexible and rigid pavements, respectively.
2. Dense-graded aggregate base (DGAB).
3. Active soil can be either frost susceptible or swelling type relative to the climatic zone.

o Flexible and rigid pavement sections may be constructed at the same site

Shaded regions indicate the location of 48A807 and 48A808 in the factorial design.

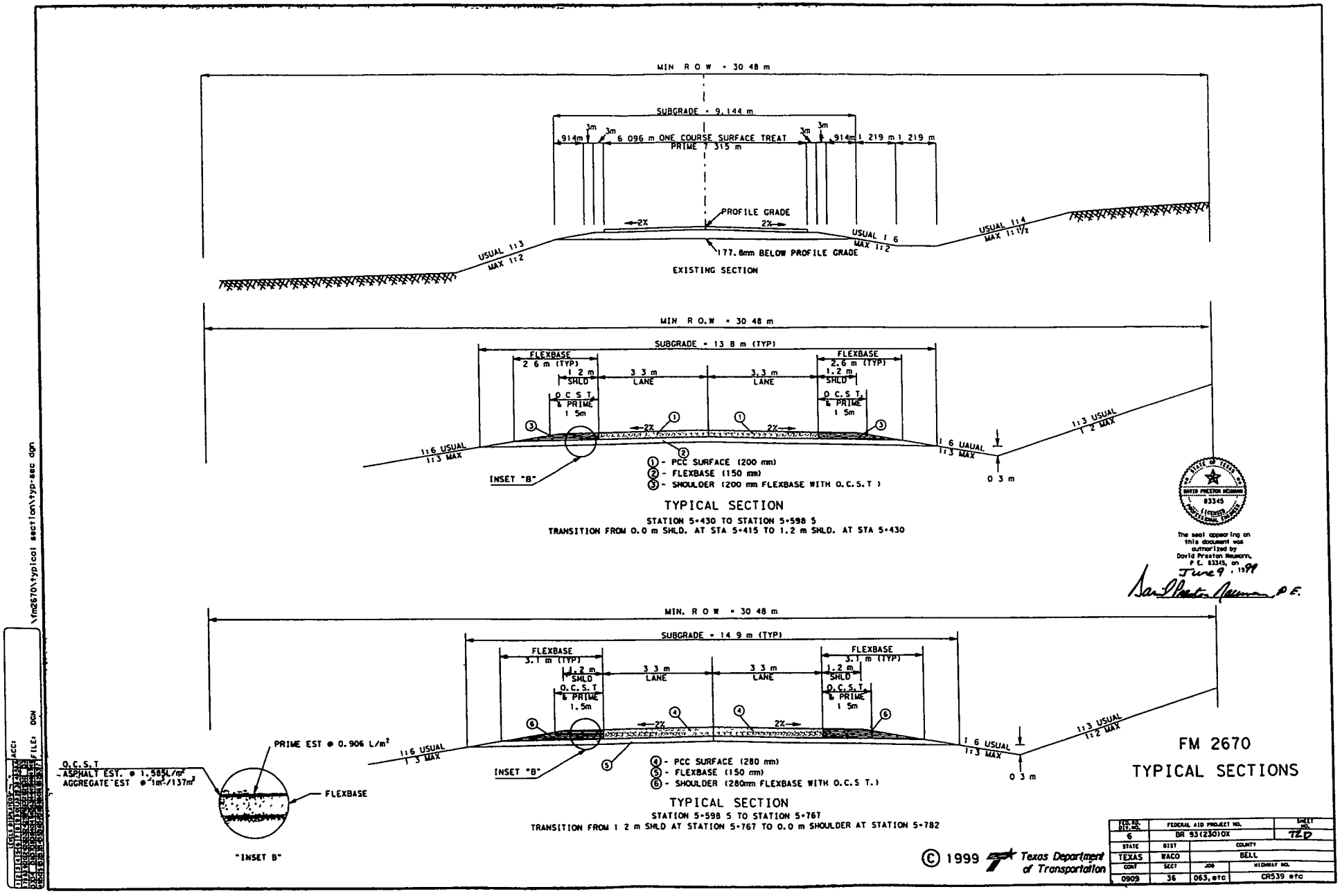

Figure 1. Typical Sections

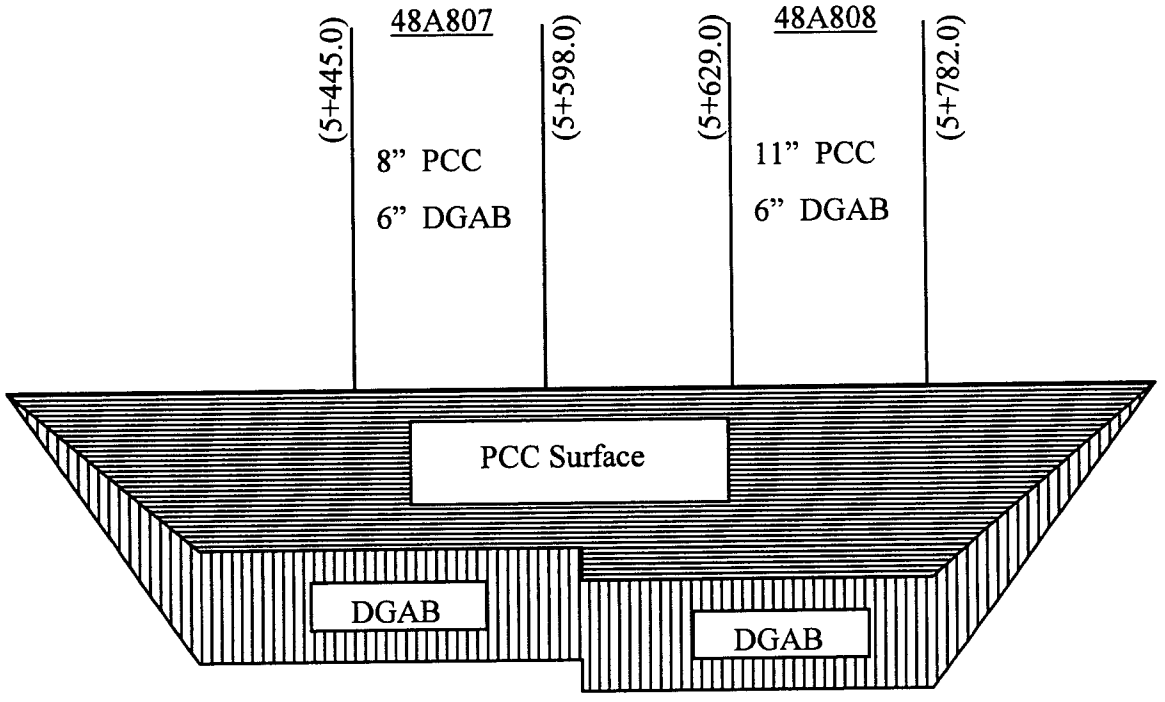

Figure 2. Elevation View of 48A807 and 48A808

Table 3. Subgrade Sampling and Testing

Activity Completed	Test Section	
	48A807	48A808
Subgrade Sampling	11/18/99	11/18/99
Subgrade Density	11/12/99	11/12/99
Subgrade Elevation	11/16/99	11/16/99
DGAB Placement	11/23/99	11/23/99[1]
DGAB Sampling	11/30/99	11/30/99[1]
DGAB Density	11/29/99	11/29/99[1]
DGAB Elevation	11/29/99	11/29/99[1]
PCC Placement	12/07/99	12/14/99[2]
PCC Sampling	12/07/99	12/14/99[2]
PCC Elevation	01/05/00	01/05/00

1. Discrepancy in base thickness required secondary placement, density and elevation events and dates.

2. The PCC placement for this section took place over two dates. The date in this table represents the date the majority of PCC was placed for this section.

CONSTRUCTION

Construction of this SPS-8 site in Bell County, Texas began with the construction of the detour around the existing pavement on FM-2670 in late October 1999. The construction then progressed to the removal of the existing pavement which began on 1 November and completed on 8 November 1999. The subgrade construction then began on 9 November and was finished for section 48A807 on 12 November and for section 48A808 on 16 November 1999. The base layer was then constructed. A thickness of 6 inches of base material was graded and compacted beginning on 17 November 1999 and the base layer was finished for section 48A807 on 23 November and for section 48A808 on 01 December 1999.

Sampling and density tests of the subgrade and base layers were performed by a local lab firm, and rod and level elevations were performed by the Southern Region Coordination Office (SRCO). The Texas DOT performed additional density and moisture content tests on the subgrade and base layers. Plate load tests were conducted on the subgrade. All required Construction Data forms were completed and are included in appendix D.

The subgrade compaction was obtained using a Caterpillar CP563 round-footed roller and a rubber-tire roller. The base compaction was performed with an Ingersoll-Rand SW1 steel-drum vibratory roller and a rubber-tire roller.

Placement of the Portland Cement Concrete (PCC) surface began on 07 December 1999 for section 48A807 and was completed the same day. The PCC placement for section 48A808 began on 14 December and the majority of section was poured this day, but the remaining 50-75 feet was poured on 15 December 1999. The reason for the 2-day pour was the lack of form work for the length of the section. No paver was used for the placement of the concrete, just a hand-held vibrator and then a vibrating screed. The concrete was brought from a ready-mix plant approximately 9.5 miles from the project site and the haul time was approximately 20 minutes for this project. The average concrete thicknesses for the sections were 6.7 inches for section 07 and 12.2 inches for section 08. The Automated Weather Station (AWS) equipment was installed on 28 December 1999. The lanes were paved at 3.3 m wide (10.9 feet), and the shoulders were 1.2 m wide (4 feet). The shoulders were constructed on 05 January 2000 and they are compacted base material at this time. A seal coat is expected to be placed sometime in March 2000. Photographs of the construction, sampling and plant are included in appendix E.

DEVIATIONS

There were some deviations from expected construction sequences and/or practices for this SPS-8 project. Specifically, the first is that the lanes are not 12-feet wide; rather they are 3.3 m (10.9 feet) and this is within the acceptable range of lane widths. The sections were moved 15 m (50 feet) to the east to account for vertical grade requirements, after the plans had been produced, and so it was necessary to change the markings on all of the plans and the Material Sampling and Testing Plan to reflect the movement of the sections. Following the movement of the sections, the Texas DOT placed their metric station stakes on the roadway and those

were found to be 2 m further east than they should have been placed; so for example, a stake that read 7+780 was actually placed at station 7+782, and thus more changes needed to be made to the layout of the sections with regard to the correct stationing on the roadway. The SRCO found the base thickness of section 08 to be only 5 inches for most of the length. The Texas DOT only found the initial 100 feet of the section, which was on the western end of the section, to be deficient in thickness. The deficiency was corrected by removing the base from the transition location beginning in section 08 through station 1+50 of that section, using the test section nomenclature. Then the newly re-exposed subgrade was removed and regraded in this area to accommodate for the correct thickness of base and the base was then replaced. This entire operation took place in less than one day and no one from the SRCO was able to be present on that day to reshoot the rod and level elevations on the new subgrade surface before the base was replaced. Therefore, the base elevations that were recorded are meaningless with regard to establishing the base thickness in these locations, but are still useful for determining the concrete thickness. Base elevations deviated from previously recorded values through station 2+00, so it is evident that the base thickness for this area (the area before 0+00 to 2+00) is not reliable. The base thickness elevations are in place solely for determination of concrete layer thickness.

The sections were poured in a patchwork fashion on several different days; section 07 was poured on 07 December and the majority of section 08 was poured on 14 December with the remaining approximately 70 feet of section 08 poured on 15 December 1999. The transition zones to connect the test sections to the existing pavement were poured on 15 December (the western end) and 17 December 1999 (the eastern end). The transition sections to the existing pavement were poured as single slabs, even though the areas were comprised of both lanes for the transition to the existing pavement. The joints were mostly sawed up to 24 hours after pouring had been completed due to relatively cool temperatures during construction. The concrete was not gaining strength quickly enough to get on the pavement to begin saw cutting at a normal 6 hour interval after pouring. As previously mentioned, the temperatures were relatively cool during pours and the high temperatures did not exceed 70°F while nightly lows were consistently in the mid to high 30s. The joints for section 07 were not sealed for almost two weeks after the section had been poured. The contractor decided to wait until the section 08 had been finished and then do the joint sealing operation for the entire project, all at once. Thus, as previously mentioned, section 07 was poured a week before the second section, so the joints were sitting open for that time until all of the joints for both sections were sealed.

STRENGTH MEASUREMENTS FOR PCC

As the SPS-8 experiment guidelines specify, the target mean value for concrete flexural strength shall be 550 psi at 14 days as determined from third-point loading tests. Table 4 shows the results from the tests completed thus far, both from field cores and field-shaped cylinders and beams. The average flexural strength at 14 days of field-formed beams was 765 psi, which well exceeds the target mean value. Other tests have been run, including compression tests of field-formed cylinders and split tensile testing of field cores and field-formed cylinders, and those results are shown in table 4.

Table 4. Initial Strength Measurements for Concrete from SPS-8 Sections

Sample Nº.	Sample Shape	Age (days)	Strength (psi)	Test Conducted
GX01	Cylinder	14	4530	Compression
GX03	Cylinder	14	4070	Compression
GX05	Cylinder	14	3890	Compression
Average			4163.3	
GY01	Cylinder	28	1770	Compression
GY03	Cylinder	28	4670	Compression
GY05	Cylinder	28	4420	Compression
Average			4545.0	
FX01	Beam	14	750	Flexural
FX02	Beam	14	710	Flexural
FX03	Beam	14	835	Flexural
Average			765.0	
FY01	Beam	28	870	Flexural
FY02	Beam	28	790	Flexural
FY03	Beam	28	875	Flexural
Average			845.0	
C01	Field Core	14	380	Split tensile
C10	Field Core	14	415	Split tensile
C14	Field Core	14	415	Split tensile
C20	Field Core	14	420	Split tensile
C23	Field Core	14	440	Split tensile
C05	Field Core	14	465	Split tensile
Average			422.5	
GY02	Cylinder	28	595	Split tensile
GY04	Cylinder	28	495	Split tensile
GY06	Cylinder	28	485	Split tensile
Average			525	

1. The target mean value for the concrete flexural strength shall be 550 psi at 14 days as determined from third-point loading tests.
2. Shaded box indicates outlier; average computed ignoring this value.

POSTCONSTRUCTION MONITORING

Upon completion of the construction, postconstruction monitoring of the pavement performance was initiated. This involves manual surveys, FWD testing, and profilometer testing. The FHWA/LTPP directives indicate that the manual surveys and profilometer testing need to be performed biennially. FWD testing is to be performed annually. Manual surveys and profilometer and FWD testing are tentatively scheduled for late March/early April 2000.

Material Sampling and Testing

Postconstruction coring for 14-day and 28-day strengths was completed on 05 January 2000. As previously noted, specific samples and corresponding tests to be performed are designated in the MST Plan included in appendix C.

SUMMARY

Having completed observations of the construction for this SPS-8 project, located on FM-2670 Eastbound in Bell County, Texas, it appears that this project will contribute significantly to the FHWA/LTPP objectives by providing valuable information about the environmental effects in the absence of heavy loads affecting rigid pavements. The efforts of the Texas DOT and their willingness to participate in this study, are greatly appreciated.

Monitoring is underway and the SRCO will continue noting changes in the surface distress, surface profile, and structural capacity, and compare the data with other projects of this nature around the country in an attempt to improve existing design methods.

APPENDIX A

SITE NOMINATION FORMS, APPROVAL CORRESPONDENCE, AND OTHER PERTINENT INFORMATION

Brent Rauhut Engineering Inc.

23 July 1997

Mr. Monte Symons
Pavement Performance Division - LTPP
Federal Highway Administration
Turner-Fairbanks Highway Research Center
6300 Georgetown Pike, Room F-215
McLean, Virginia 22101

Subject: Texas SPS-8 Project Nomination

Dear Monte,

Enclosed are the nomination forms for the SPS-8 project to be located on FM-2670, south of Killeen, Texas in Bell County, as Debbie Walker has previously discussed with Charlie Churilla. This is a two-lane farm to market (FM) road on moderately active clays. You will note from the nomination forms that the district is also proposing to provide the rigid sections for this SPS-8 project. With these features in mind, this project should make significant contributions to the LTPP studies. The district plans to add sufficient tangent sections at each end to ensure sufficient length for the two test sections.

This project is scheduled for a letting early next year and hence your prompt attention to this nomination will be greatly appreciated. If there is any additional information you require, please let us know. Thank you for your consideration in this matter.

Sincerely,

Jerry F. Daleiden, P.E.
Project Engineer, SRCO

JFD:dmj

Enclosure: As stated.

c.w/Enc: Gonzalo Rada, PCS/LAW
B.F. Templeton, TXDOT
Doug Hunnicutt, TXDOT/Waco Dist.
Mark Gardner, SRCO/File:
Debbie Walker, TXDOT
John E. Nichols, FWHA/Texas Div.
Billy Pigg, TXDOT/Waco Dist.

8240 Mopac, Suite 220 • Austin, Texas 78759 • (512) 346-0870 • FAX (512) 346-8750

Texas Department of Transportation

FAX COVER SHEET

TO:	Jerry Daleiden
DEPARTMENT:	BRE, Inc
TELEPHONE:	512.346.0870
FACSIMILE:	512.346.8750

FROM:	Debbie Walker
DEPARTMENT:	Design Division-Pavements Section
TELEPHONE:	512 467.3914
FACSIMILE:	512 465.3681
SUBJECT:	SPS-8 Nomination

COMMENTS:

Please review the following information regarding the nomination of an SPS-8 site in the Waco District. I spoke to Charlie Churilla about this site and he would like for you to review this, also (since the district needs an answer ASAP). I hope that you have time to review this today. I will call you after lunch today to discuss.

Thank you for your support.

Debbie

Debbie Walker

Texas Department of Transportation

DEWITT C GREER STATE HIGHWAY BLDG • 125 E 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-0585

May 28, 1997

Mr Charles Churilla
SHRP Implementation Coordinator
Federal Highway Administration
Turner-Fairbank Highway Research Center
6300 Georgetown Pike HTA-3
McLean, Virginia 22101

Dear Mr. Churilla:

Attached is a nomination form for an SPS-8 site to be located in the Waco District in Texas along with some additional information.

Your consideration of this request will be appreciated.

Sincerely,

Original Signed by B. F. Templeton, P.E.

B F. Templeton, P E.
Assistant Executive Director
Field Operations

Attachment

Texas Department of Transportation

MEMORANDUM

TO: B F. Templeton, P E

DATE: May 21, 1997

FROM: Robert L.Wilson, P.E.

Originating Office
Pavements Section

SUBJECT: SPS-8 Nomination
Waco District, Bell County

In response to your memo dated 12/19/96, we have received a nomination for a SPS-8 site. The proposed site is located in the Waco District. The candidate site meets the requirements for participation in the LTPP program.

If this site is selected, the district has requested that construction of the site be used with HBRRP funding, as stated in Mr. Gerald Effer's 7/15/96 memo

Attached are the following forms to be forwarded to FHWA for nomination into the LTPP study:

- memo to Ms. Debbie Walker from Mr. Doug Huneycutt re: SPS-8 Nomination
- project identification
- map of proposed SPS-8 site
- SPS-8 nomination form
- memo to Mr. Kirby Pickett from Mr Stan Burrier re 20-year Traffic Analysis
- schematic showing new location.

Please review the attached information and forward to Mr Charlie Churilla at FHWA for consideration. If you have any questions, please feel free to call me.

Your support with this request is very much appreciated.

Robert L Wilson

cc: Ken Fults, P.E DES-PAV

Form 1550 (5/93) Date 5/19/97

TO: Mr Wilson

FROM: Ken Fulton

- ☐ Please handle
- ☐ Please see/call me
- ☐ Review and comment
- ☐ For your information
- ☒ For your approval
- ☐ Prepare answer my/your signature

REMARKS: Forward to Mr. Singleton once you have signed. Thanks!

Texas Department of Transportation

MEMORANDUM

TO: B.F. Templeton, P.E. **DATE:** May 21, 1997

FROM: Robert L.Wilson, P.E. **Originating Office** Pavements Section

SUBJECT: SPS-8 Nomination
Waco District, Bell County

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- memo to Mr. Kirby Pickett from Mr. Stan Burrier re: 20-year Traffic Analysis
- schematic showing new location

Please review the attached information and forward to Mr. Charlie Churilla at FHWA for consideration. If you have any questions, please feel free to call me.

Your support with this request is very much appreciated.

cc: Ken Fults, P.E. DES-PAV

Texas Department of Transportation

MEMORANDUM

TO: Ms Debbie Walker
LTTP Coordinator
Design Division
Pavements Section

DATE: April 1, 1996

FROM: Doug Huneycutt, P E
Director of Transportation
Planning & Development, Waco

ORIGINATED BY: CDH

SUBJECT: SHRP Specific Pavement Studies
SPS-8 Site
Bell County
CSJ 0909-36-063

We have reviewed our bridge replacement projects for possible candidate SPS-8 study sites and recommend that the Off-System Bridge Project known locally as the Maxdale Crossing be considered for inclusion in the study As we have previously discussed, the proposed site meets the requirements of the program, i e , it is a low volume road that can be evaluated for effects of the environment in the absence of heavy loads

The enclosed schematic indicates the location and geometric of the proposed roadway As you can see, the new bridge is being placed upstream of the existing crossing This design allows for better alignment of the roadway and preserves the existing historic structure by leaving it in place The District plans to place the constructed portions of the roadway onto the State system once the construction is complete It will become an extension of FM 2670

The scheduled date to let the contract is June 1998 Design work is underway and therefore any special design considerations should be known as soon as possible We request that the construction cost of the test pavement sections be authorized for payment with HBRRP funding As we discussed previously, the district agrees to construct the pavement section, including approach shoulders, with Portland Cement Concrete Please furnish the Pavement design as soon as possible

If you have any further questions, please contact me at 817-867-2730 We look forward to participating in the study

CC Kirby Pickett, P E
Joe Nelson, P E
Jim Cowan, P E
Richard Brown, P E
Reggie Richardson, P E
Ron Koester, P E
Billy Pigg, P E
Ralph Banks, P E DES-BRG

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UPDATE MODE          PROJECT IDENTIFICATION (P1)    ENGLISH PROJECT     DCIS.02A
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PSE  0__ % COMPLETE        ROW  0   % COMPLETE     CONST  0 _ % COMPLETE
LIMITS FROM   ON CR 539_____________________________
      TO      AT LAMPASAS RIVER___________________________
TYPE OF WORK  REPL BR & APPRS_____________________  SPEC BOOK YEAR  93
LAYMANS DESC  REPLACE BRIDGE AND APPROACHES_____________________________
              ____________________________________________________________
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OTHER PARTICIPATION 55640_____
CONTRACT CSJ     090936063              PROJECT NUMBER   BR 93(230)OX_______
FUNCTIONAL CLASS  7    TRUNK SYS  N    PROJECT CLASSIFICATION          BR_
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PROJECT DESCENDENTS    _________ _________ ___ _____ _________ _________
REMARKS  HISTORIC BRIDGE,PARKER THRU-TRUSS_____________________________
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      ID    FIN   EVAL  EST   SUM   PDP   STIP                    METR  MENU
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DCS2B010-NO CHANGES MADE; PLEASE CONTINUE.

UPDATE MODE PROJECT FINANCE (P2) DCIS.03B

CTL-SEC-JOB **0909-36-063** DISTRICT ESTIMATED AMOUNT **600000**

TOTAL OBG AMOUNT **0.00** DATE OF LAST ESTIMATE **12 12 96**

LOCAL CONTRIBUTION **0** PRELETTING ENGINEERS EST AMT **0.00**

WORK PROGRAM	PROGRAM COST	APPL PCT	APPN CODE	CATE-GORY	FIXED FLAG	ROW COST	FUNCT FM	FUNCT TO	DATE		MIN ORI NUMBEI
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	0					0	0	0	0	0	
	0					0	0	0	0	0	
	0					0	0	0	0	0	
	0					0	0	0	0	0	
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	0					0	0	0	0	0	
	0					0	0	0	0	0	
TOTAL	556400					0					

' USE PF10 KEY TO OBTAIN PROJECT FINANCE - PERCENT SCREEN '

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ID FIN EVAL EST SUM PDP STIP PCT MENU

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DCSC0315-NO CHANGES MADE; PLEASE CONTINUE
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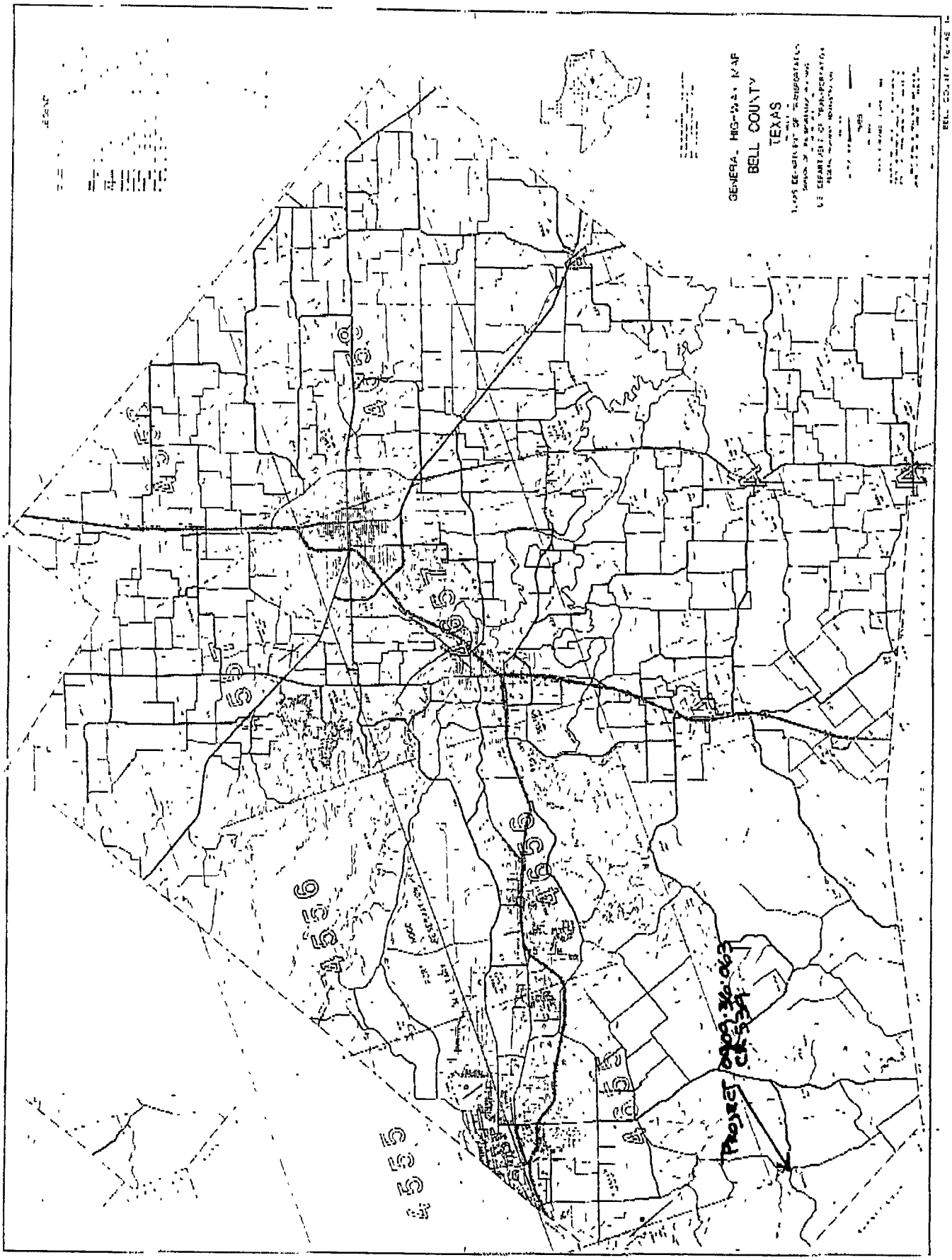
 LOCATION FROM: ON CR 539                                  CNTY 014 BELL
          TO  : AT LAMPASAS RIVER                          ACT LET
 LAYMANS DESC : REPLACE BRIDGE AND APPROACHES
              :
            PROJECT INFORMATION                      PROJECT CODING
          PROJECT ID                          FED PROJ NO      BR 93(230)OX
    FUNCTIONAL CLASS  7                       STATE CATEGORY   6B
    EXIST # OF LANES   1                      PHASE          C X PE    ROW    TR
    PROP  # OF LANES   2                      MPO CODE                    0
      PROJECT LENGTH  MILES       0.117       TIP YEAR                 1998
 IMPLEMENTING AGENCY                          STIP REVISION DATE       121996
                                              DISTRICT EST LET DATE    9806
                                  PROJECT FUNDING
                                                 EST CONST COST:       556400.00
 APPN CODE   1 117   COST:  1       556400   LOCAL CONTRIBUTION:           0.00
             2                2            0      TOTAL FEDERAL:       445120.00
             3                3            0        TOTAL STATE:        55640.00
             4                4            0        TOTAL LOCAL:        55640.00
 REMARKS:
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
MENU  ID    FIN   EVAL  EST   SUM   PDP   STIP                      METR  MENU
```


GENERAL HIGHWAY MAP
BELL COUNTY
TEXAS
Project Limits

SPS-8 Nomination Form/10 July 91

SHEET A. SPS-8 CANDIDATE PROJECT NOMINATION AND INFORMATION FORM

STATE Texas SHRP SECTION NO. _____

PROJECT LOCATION

ROUTE NUMBER CR 539

ROUTE SIGNING [ ] Interstate [ ] U.S. [ ] State [X] County
Other _____

PROJECT LOCATION Start Milepost _____ End Milepost _____
Start Milepost _____ End Milepost _____

DIRECTION OF TRAVEL [ ] North B. [ ] South B. [X] West B. [X] East B.

PROJECT LOCATION DESCRIPTION Off-System Bridge Replacement

COUNTY Bell
HIGHWAY AGENCY DISTRICT NUMBER 9 (Waco)
SHRP ENVIRONMENTAL ZONE
[ ] Wet Freeze [ ] Wet No-Freeze [ ] Dry Freeze [X] Dry No-Freeze

SUBGRADE SOIL CATEGORY
[ ] Active [X] Fine Grained [ ] Coarse Grained

TYPE OF ACTIVITY DEGREE OF ACTIVITY
[X] Swelling [ ] Frost Heave [X] Low [ ] Moderate [ ] High

SIGNIFICANT DATES

LATEST DATE OF APPROVAL NOTIFICATION FROM SHRP 6/98
CONTRACT LETTING DATE 8/98
ESTIMATED CONSTRUCTION START DATE 8/99
ESTIMATED DATE TEST SECTIONS OPENED TO TRAFFIC 8/99
ESTIMATED CONSTRUCTION COMPLETION DATE

PROJECT DESCRIPTION

PROJECT TYPE [ ] New Route [X] Removal and Reconstruction
[ ] Parallel Roadway
Other The new bridge location will be 1/4 mile upstream resulting in approximately 1/2 mile of new roadway. The existing FM 2670 will connect to the new bridge and be taken into the State system.

DESIGN TRAFFIC DATA

ANNUAL AVERAGE DAILY TRAFFIC (TWO DIRECTIONS) 150
% HEAVY TRUCKS AND COMBINATIONS (OF AADT) 5.3
ESTIMATED 18K ESAL RATE IN STUDY LANE (1,000 ESAL/YR) 2.15
TOTAL DESIGN 18K ESAL APPLICATIONS IN DESIGN LANE 43000
DESIGN PERIOD (Years) 20

SPS-8 Nomination Form/10 July 91

SHEET B. SPS-8 CANDIDATE PROJECT NOMINATION AND INFORMATION FORM

STATE TEXAS SHRP SECTION NO. _____

AGENCY'S PAVEMENT STRUCTURE DESIGN FOR SITE

LAYER[1] NO.	LAYER[2] DESCRIPTION CODE	MATERIAL TYPE[3] CLASS CODE	THICKNESS[4] (INCHES)	STRUCTURAL[5] COEFFICIENT
1	07	42	60.0	
2	06			
3	04	01	4.0	
4	03	06		
5				
6				
7				
8				
9				

STRUCTURAL DESIGN METHOD [ ] 1972 AASHTO [ ] 1986 AASHTO [ ] Modified AASHTO
Other Pavement designs will be consistent with the "Rigid" pavement des
Criterion of Table 1 of the SPS-8 Design & Research plan
AASHTO DESIGN RELIABILITY FACTORS R% _____ S_o _____

OUTSIDE SHOULDER TYPE

[ ] Turf [ ] Granular [ ] Asphalt Concrete [ ] Surface Treatment
[X] PCC [ ] Curb and Gutter Other _____

OUTSIDE SHOULDER WIDTH (Feet) 4ft. (1.2m) _____

SUBSURFACE EDGE DRAINS [ ] Yes [X] No

NOTES

1. Layer 1 is the natural occurring subgrade soil. The pavement surface will have the largest assigned layer number.

2. Layer description codes:
   Surface Layer..... 03 Base Layer..... 05 Subgrade..... 07
   Subsurface HMAC... 04 Subbase Layer... 06 Embankment (Fill)... 11

3. Refer to Tables 1 through 4 for material class codes.

4. If subgrade depth to a rigid layer is known, enter this depth for subgrade thickness, otherwise leave subgrade layer thickness blank.

5. Enter AASHTO structural layer coefficient value, as appropriately modified, used in pavement design or typical coefficient used by agency for this material. For the subgrade, enter either AASHTO soil support value or resilient modulus value (psi) used in design.

SPS-8 Nomination Form/10 July 91

SHEET C. SPS-8 CANDIDATE PROJECT NOMINATION AND INFORMATION FORM

STATE Texas SHRP SECTION NO. _____

TEST SECTION LAYOUT

NUMBER OF TEST SECTIONS ENTIRELY ON: FILL 0 CUT 0

SHORTEST TRANSITION BETWEEN CONSECUTIVE TEST SECTIONS (Feet) _____

VERTICAL GRADE (Avg %) (+ upgrade; - downgrade) -1.4516 %

HORIZONTAL CURVATURE (Degrees) [ ] Tangent r=500m

COMMENTS ON DEVIATIONS FROM DESIRED SITE LOCATION CRITERIA _____

OTHER SHRP TEST SECTIONS

FLEXIBLE - DOES AGENCY DESIGN CONFORM TO GPS-1 PROJECT CRITERIA? [ ] Yes [ ] No

RIGID - DOES AGENCY DESIGN CONFORM TO GPS-3 PROJECT CRITERIA? [ ] Yes [ ] No

DISTANCE TO NEAREST GPS TEST SECTION ON SAME ROUTE (Miles) _____

TEST SECTION NUMBER OF NEAREST GPS SECTION _____

SUPPLEMENTAL TEST SECTIONS

IF SUPPLEMENTAL EXPERIMENTAL TEST SECTIONS ARE PROPOSED, COMPLETE THE FOLLOWING

TOTAL NUMBER OF SUPPLEMENTAL TEST SECTIONS N/A

FACTORS TO BE INVESTIGATED _____

APPENDIX B

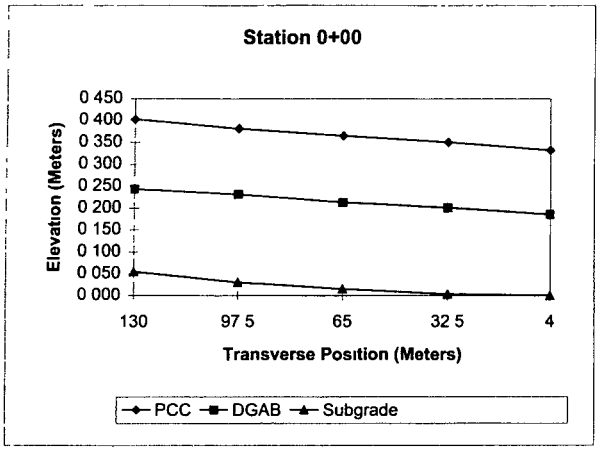
SURFACE PROFILE DATA
AND
LAYER THICKNESS MEASUREMENTS

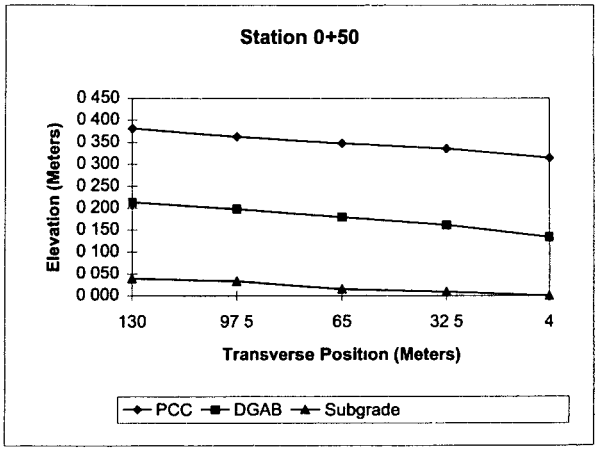
Texas SPS-8 (48A807)

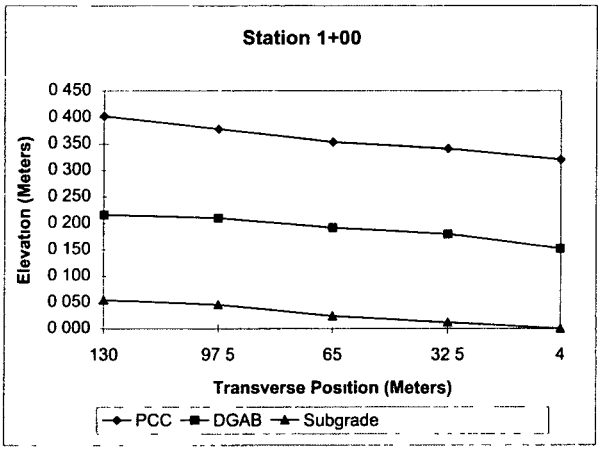
Transverse Offset	3 LAYERS	ELEVATION 4 00 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 32 50 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 65 00 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 97 50 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 130 00 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches
0+00	PCC	3 243	5 760	7 320	3 261	5 880	7 800	3 277	6 000	7 800	3 292	5 880	7 920	3 313	6 240	7 440
	DGAB	3 097			3 112			3 124			3 142			3 155		
	Subgrade	2 911			2 914			2 926			2 941			2 966		
0+50	PCC	3 987	7 080	5 280	4 008	6 840	6 000	4 020	6 600	6 480	4 036	6 480	6 480	4 054	6 600	6 840
	DGAB	3 807			3 834			3 853			3 871			3 886		
	Subgrade	3 673			3 682			3 688			3 706			3 712		
1+00	PCC	4 645	6 600	6 000	4 666	6 360	6 600	4 679	6 360	6 600	4 703	6 600	6 480	4 727	7 320	6 360
	DGAB	4 478			4 505			4 517			4 535			4 542		
	Subgrade	4 325			4 337			4 349			4 371			4 380		
1+50	PCC	5 282	5 400	5 280	5 297	5 640	5 760	5 313	5 760	6 000	5 331	6 120	6 240	5 346	6 480	6 360
	DGAB	5 145			5 154			5 166			5 176			5 182		
	Subgrade	5 011			5 008			5 014			5 017			5 020		
2+00	PCC	5 779	6 720	6 120	5 806	6 960	6 360	5 822	6 960	6 240	5 843	6 960	5 880	5 861	7 080	5 880
	DGAB	5 608			5 630			5 645			5 666			5 681		
	Subgrade	5 453			5 468			5 486			5 517			5 532		
2+50	PCC	6 212	6 720	5 040	6 233	6 720	5 280	6 245	6 720	5 520	6 267	7 200	5 160	6 285	7 680	5 160
	DGAB	6 041			6 062			6 075			6 084			6 090		
	Subgrade	5 913			5 928			5 934			5 953			5 959		
3+00	PCC	6 651	6 720	5 760	6 669	6 720	5 760	6 681	6 600	5 520	6 703	6 840	5 400	6 721	7 560	4 920
	DGAB	6 480			6 498			6 514			6 529			6 529		
	Subgrade	6 334			6 352			6 373			6 392			6 404		
3+50	PCC	7 044	6 840	5 880	7 062	6 600	6 000	7 077	6 360	6 000	7 096	6 360	6 240	7 114	6 720	5 760
	DGAB	6 870			6 895			6 916			6 934			6 943		
	Subgrade	6 721			6 742			6 764			6 776			6 797		
4+00	PCC	7 428	7 320	6 960	7 440	6 720	6 840	7 458	6 600	6 840	7 477	6 720	7 080	7 492	6 960	6 480
	DGAB	7 242			7 269			7 291			7 306			7 315		
	Subgrade	7 065			7 096			7 117			7 126			7 151		
4+50	PCC	7 797	7 320	6 120	7 815	7 200	6 240	7 830	7 200	6 120	7 849	7 440	6 000	7 861	7 440	5 880
	DGAB	7 611			7 632			7 647			7 660			7 672		
	Subgrade	7 455			7 474			7 492			7 507			7 522		
5+00	PCC	8 166	7 080	6 000	8 178	6 720	6 240	8 196	6 840	5 880	8 214	7 200	5 400	8 236	7 560	5 400
	DGAB	7 986			8 007			8 022			8 031			8 044		
	Subgrade	7 833			7 849			7 873			7 894			7 907		
	AVG	**6 687**	**5.964**		**6.540**	**6.252**		**6 504**	**6.276**		**6 684**	**6.240**		**7 056**	**6 060**	
	MAX	**7.320**	**7.320**		**7.200**	**7 800**		**7.200**	**7 800**		**7.440**	**7 920**		**7 680**	**7.440**	
	MIN	**5.400**	**5 040**		**5 640**	**5.280**		**5 760**	**5 520**		**5 880**	**5 160**		**6.240**	**4 920**	
	STD	**0.577**	**0 685**		**0.440**	**0 665**		**0 390**	**0 653**		**0 474**	**0 792**		**0 494**	**0 744**	

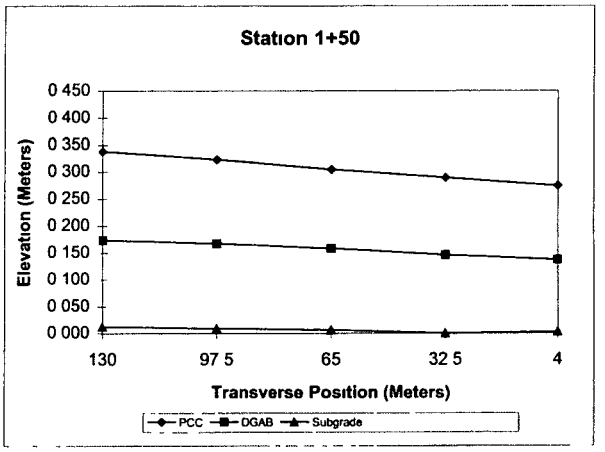
	PCC	DGAB
SECTION AVG	6 716	6 153
SECTION MAX	7 680	7 920
SECTION MIN	5 400	4 920
SECTION STD	0 505	0 690

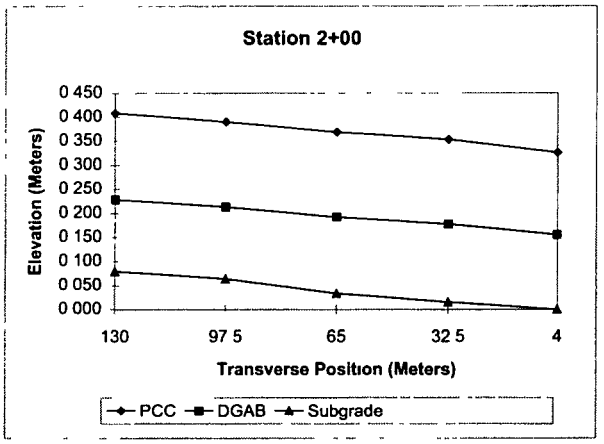
Section 48A807

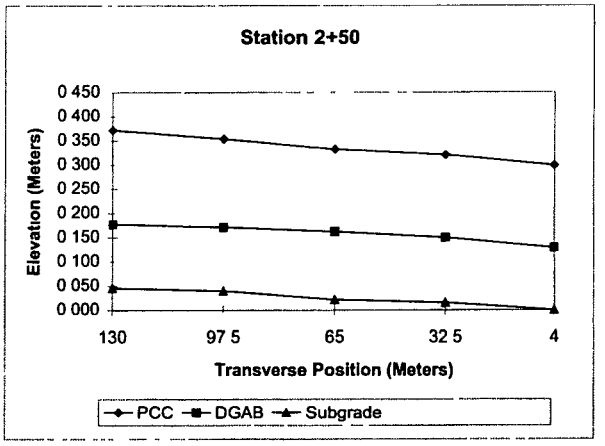




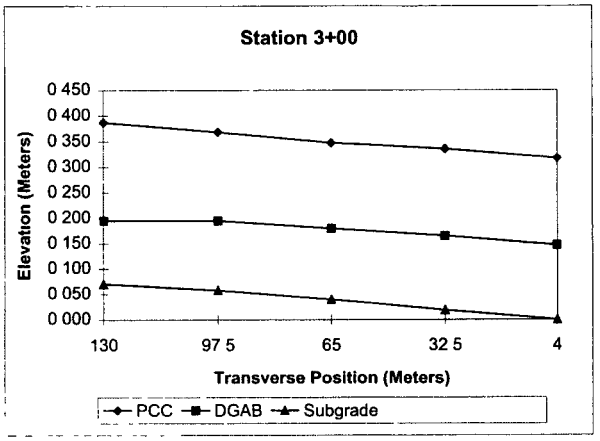


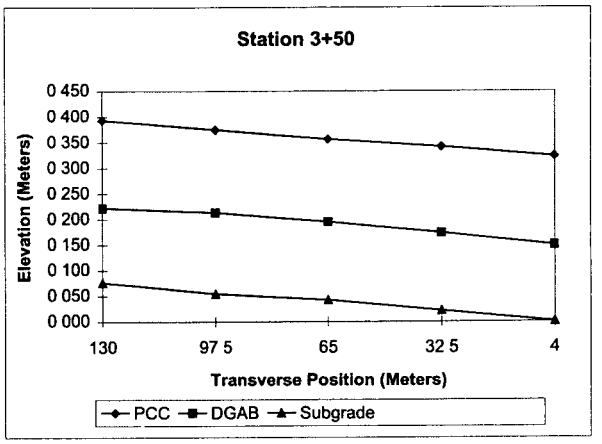


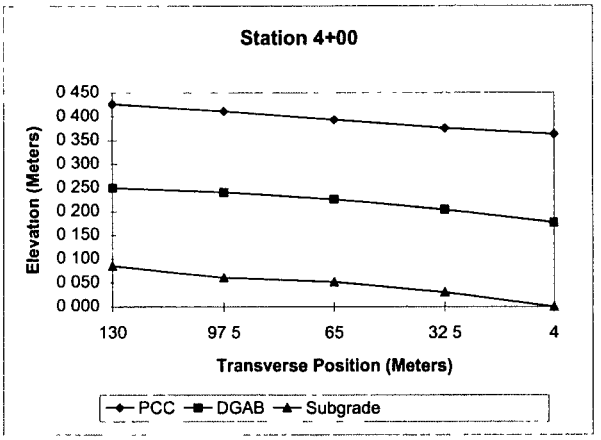


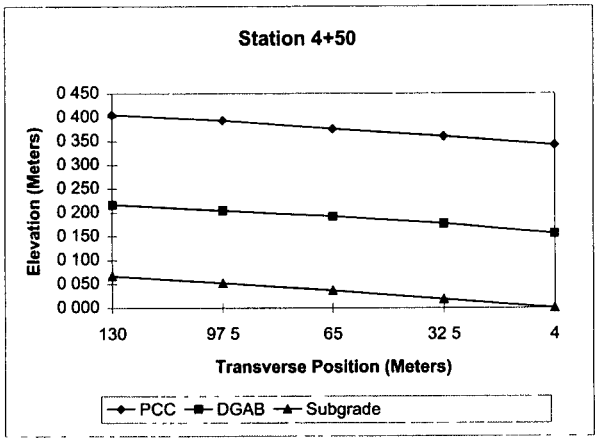


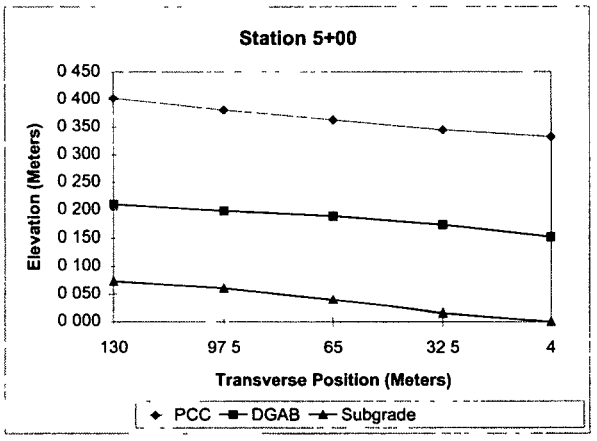
Section 48A807









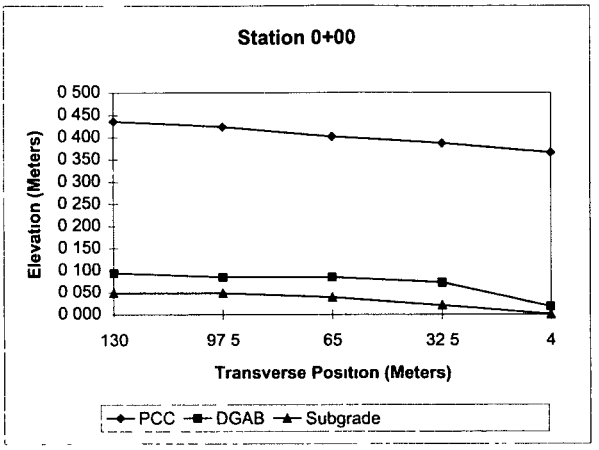


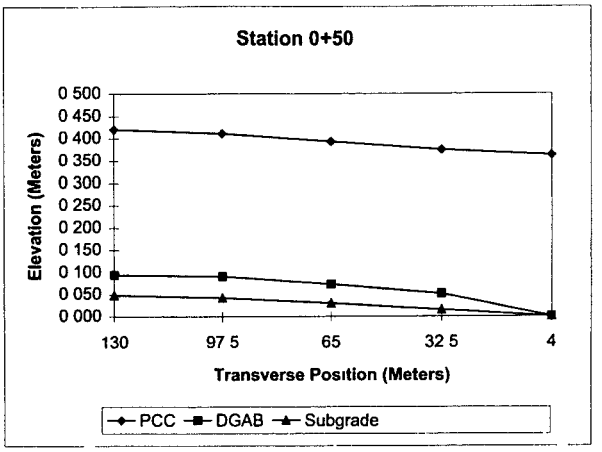
Texas SPS-8 (48A808)

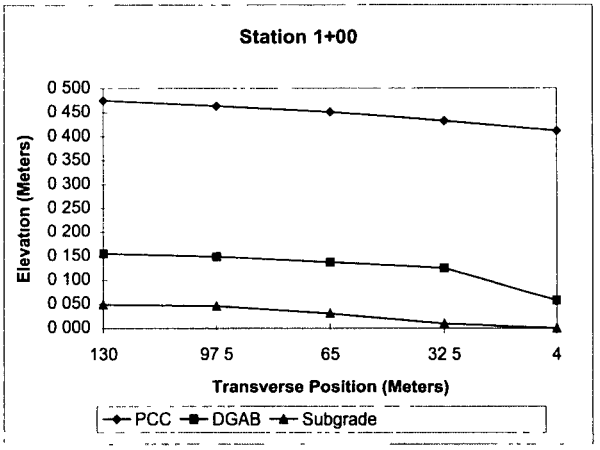
Transverse Offset	3 LAYERS	ELEVATION 4 00 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 32 50 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 65 00 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 97 50 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches	ELEVATION 130 00 Inches	PCC THICKNESS Inches	DGAB THICKNESS Inches
0+00	PCC	2 545	13 680	0 720	2 566	12 360	2 040	2 582	12 480	1 800	2 603	13 320	1 440	2 615	13 440	1 800
	DGAB	2 198			2 252			2 265			2 265			2 274		
	Subgrade	2 179			2 201			2 219			2 228			2 228		
0+50	PCC	2 944	14 280	0 000	2 957	12 720	1 440	2 975	12 600	1 680	2 993	12 600	1 920	3 002	12 840	1 800
	DGAB	2 582			2 633			2 655			2 673			2 676		
	Subgrade	2 582			2 597			2 612			2 624			2 630		
1+00	PCC	3 365	13 920	2 280	3 386	12 120	4 560	3 405	12 360	4 200	3 417	12 360	4 080	3 429	12 600	4 200
	DGAB	3 011			3 078			3 091			3 103			3 109		
	Subgrade	2 954			2 963			2 984			2 999			3 002		
1+50	PCC	3 801	14 040	1 920	3 819	12 720	3 600	3 834	12 600	3 720	3 850	13 080	3 240	3 862	13 800	2 760
	DGAB	3 444			3 496			3 514			3 517			3 511		
	Subgrade	3 395			3 405			3 420			3 435			3 441		
2+00	PCC	4 237	13 920	1 800	4 255	12 720	2 760	4 273	12 360	3 120	4 289	12 960	2 400	4 304	13 200	2 400
	DGAB	3 883			3 932			3 959			3 959			3 968		
	Subgrade	3 837			3 862			3 880			3 898			3 908		
2+50	PCC	4 682	11 280	4 800	4 697	11 160	4 680	4 718	11 520	4 680	4 730	11 400	5 040	4 737	11 280	5 040
	DGAB	4 395			4 414			4 426			4 441			4 450		
	Subgrade	4 273			4 295			4 307			4 313			4 322		
3+00	PCC	5 108	11 520	5 040	5 127	11 520	5 160	5 142	11 400	5 160	5 160	11 520	5 280	5 169	11 640	5 160
	DGAB	4 816			4 834			4 852			4 868			4 874		
	Subgrade	4 688			4 703			4 721			4 734			4 743		
3+50	PCC	5 505	11 400	5 160	5 526	11 400	5 160	5 550	11 640	5 400	5 563	11 520	5 640	5 572	11 520	5 880
	DGAB	5 215			5 236			5 255			5 270			5 279		
	Subgrade	5 084			5 105			5 118			5 127			5 130		
4+00	PCC	5 886	11 160	5 160	5 907	11 280	5 160	5 922	11 160	5 280	5 944	11 400	5 520	5 959	11 760	5 400
	DGAB	5 602			5 621			5 639			5 654			5 660		
	Subgrade	5 471			5 489			5 505			5 514			5 523		
4+50	PCC	6 258	10 920	4 440	6 279	11 160	4 560	6 297	11 040	4 440	6 312	11 160	4 200	6 325	11 400	4 200
	DGAB	5 980			5 995			6 017			6 029			6 035		
	Subgrade	5 867			5 880			5 904			5 922			5 928		
5+00	PCC	6 635	11 640	5 880	6 648	11 880	5 760	6 663	11 880	5 520	6 675	11 880	5 280	6 681	12 120	4 680
	DGAB	6 340			6 346			6 361			6 373			6 373		
	Subgrade	6 190			6 200			6 221			6 239			6 254		
	AVG	**12.524**	**3 540**		**11.832**	**4.212**		**11 868**	**4 188**		**12 024**	**4 164**		**12.240**	**4 092**	
	MAX	**14.280**	**5 880**		**12 720**	**5 760**		**12 600**	**5 520**		**13 320**	**5 640**		**13 800**	**5 880**	
	MIN	**10 920**	**0 000**		**11 160**	**1.440**		**11 040**	**1 680**		**11 160**	**1 440**		**11.280**	**1 800**	
	STD	**1.337**	**2 002**		**0 586**	**1 354**		**0 572**	**1 338**		**0 728**	**1 435**		**0 843**	**1.400**	

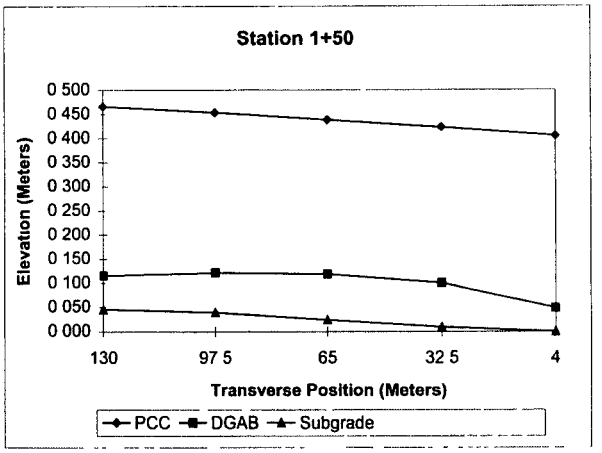
	PCC	DGAB
SECTION AVG	12 157	3 899
SECTION MAX	14 280	5 880
SECTION MIN	10 920	0 000
SECTION STD	0 899	1 546

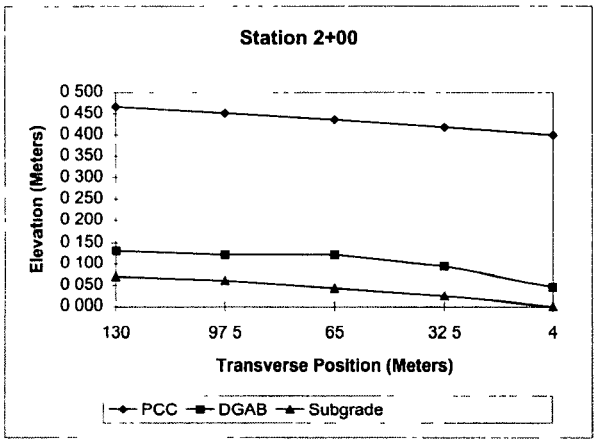
Section 48A808

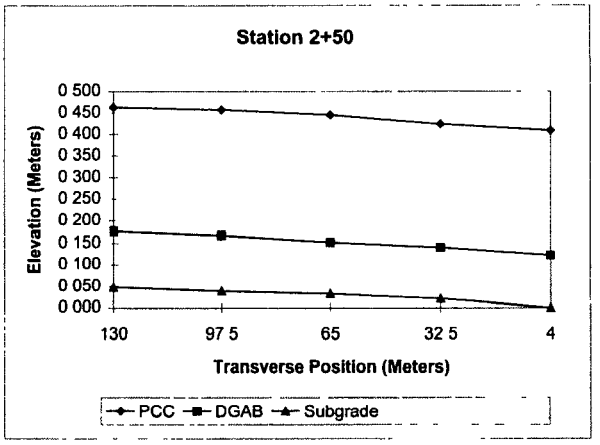




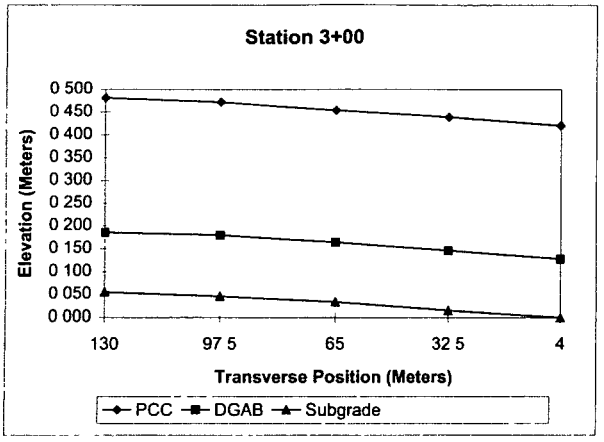


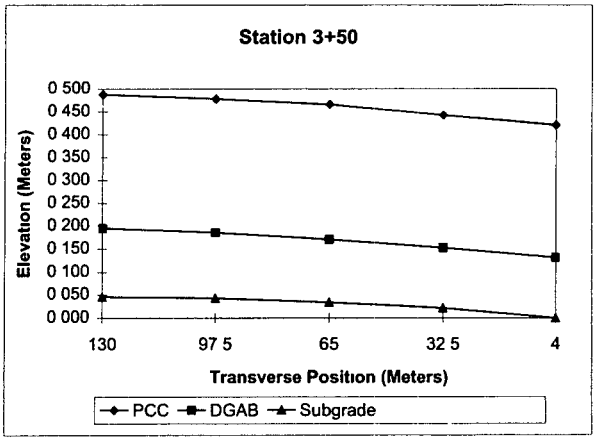


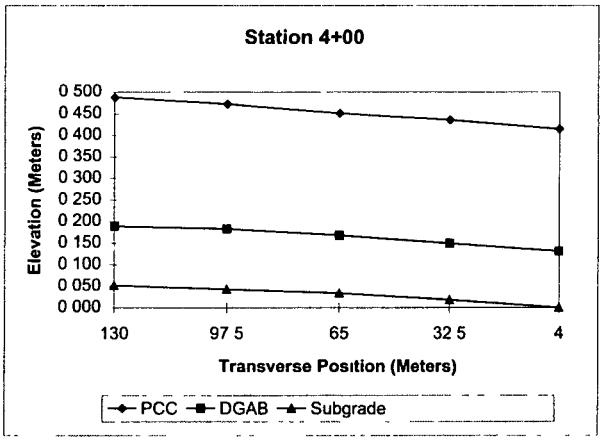


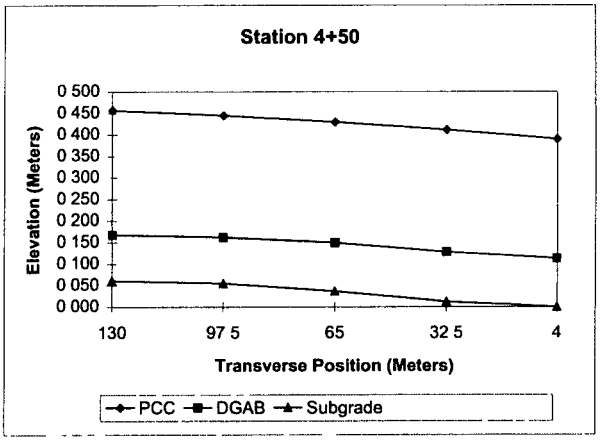


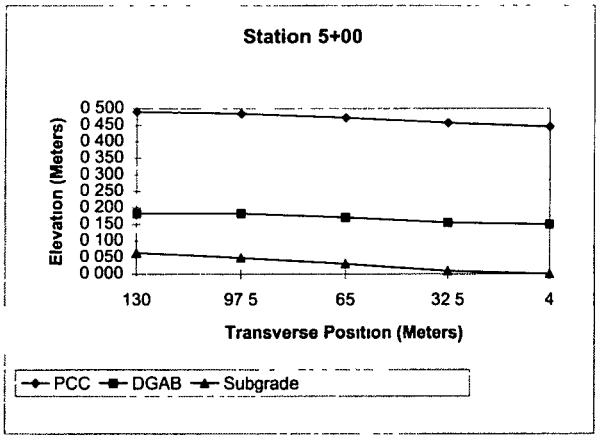
Section 48A808











LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 11/16/1999
SURVEYOR JLP, ACH, MJH

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 07
LAYER SUBGRADE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25		8.39	8.44	8.47	8.46	8.51
0+00		9.55	9.56	9.60	9.65	9.73
0+50		12.05	12.08	12.10	12.16	12.18
1+00		14.19	14.23	14.27	14.34	14.37
1+50		16.44	16.43	16.45	16.46	16.47
2+00		17.89	17.94	18.00	18.10	18.15
2+50		19.40	19.45	19.47	19.53	19.55
3+00		20.78	20.84	20.91	20.97	21.01
3+50		22.05	22.12	22.19	22.23	22.30
4+00		23.18	23.28	23.35	23.38	23.46
4+50		24.46	24.52	24.58	24.63	24.68
5+00		25.70	25.75	25.83	25.90	25.94
5+25		26.34	26.37	26.43	26.48	26.51

NOTES B.M. COTTON SPINDLE IN P. POLE, STA. I 1+95, NORTH OF N. R.O.W. FENCE, ASSUMED ELEV. = 20.00 FT.
T.B.M. PAINT DOT ON CONC. BASE OF FENCE POST S.E. CORNER WEATHER STATION, ELEV. = 21.46 FT.; TIE-IN - FLAT

LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 11/29/1999
SURVEYOR JLP, TJM

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 07
LAYER BASE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25		8.88	8.94	8.98	~~9.70~~ 9.00	9.01
0+00		10.16	10.21	10.25	10.31	10.35
0+50		12.49	12.58	12.64	12.70	12.75
1+00		14.69	14.78	14.82	14.88	14.90
1+50		16.88	16.91	16.95	16.98	17.00
2+00		18.40	18.47	18.52	18.59	18.64
2+50		19.82	19.89	19.93	19.96	19.98
3+00		21.26	21.32	21.37	21.42	21.42
3+50		22.54	22.62	22.69	22.75	22.78
4+00		23.76	23.85	23.92	23.97	24.00
4+50		24.97	25.04	25.09	25.13	25.17
5+00		26.20	26.27	26.32	26.35	26.39
5+25		26.84	26.91	26.97	27.02	27.05

NOTES B.M. COTTON SPINDLE IN P. POLE, STA. ± 1+95, NORTH OF N. R.O.W. FENCE, ASSUMED ELEV. = 20.00 FT; T.P. #1 ℄ HUB ± 0+49, ELEV. = 12.68; TP #2 ℄ 1+50, ELEV. = 17.00; T.B.M. PAINT DOT ON CONC. BASE OF FENCE POST S.E. CORNER WEATHER STATION, ELEV. = 21.46 FT.; TIE-IN: 21.46 ✓.

LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 01/05/1999
SURVEYOR MJH / JLP

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 07
LAYER PCC SURFACE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25		9.44	9.52	9.58	9.60	9.62
0+00		10.64	10.70	10.75	10.80	10.87
0+50		13.08	13.15	13.19	13.24	13.30
1+00		15.24	15.31	15.35	15.43	15.51
1+50		17.33	17.38	17.43	17.49	17.54
2+00		18.96	19.05	19.10	19.17	19.23
2+50		20.38	20.45	20.49	20.56	20.62
3+00		21.82	21.88	21.92	21.99	22.05
3+50		23.11	23.17	23.22	23.28	23.34
4+00		24.37	24.41	24.47	24.53	24.58
4+50		25.58	25.64	25.69	25.75	25.79
5+00		26.79	26.83	26.89	26.95	27.02
5+25		27.40	27.48	27.54	27.58	27.65

NOTES B.M. COTTON SPINDLE IN P. POLE, STA. ± 1+95, NORTH OF N. R.O.W. FENCE, ASSUMED ELEV. = 20.00 FT.
T.B.M. PAINT DOT ON CONC. BASE OF FENCE POST S.E. CORNER WEATHER STATION, ELEV. = 21.46 FT.; TP # 1 ± 1+15, ELEV. = 15.955; TP # 2 @ 1+48, ELEV. = 17.325; TP # 3 @ TBM, ELEV. = 21.46; TIE-IN - FLAT

LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 11/16/1999
SURVEYOR JLP, ACH, MJH

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 08
LAYER SUBGRADE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25		6.44	6.45	6.49	6.50	6.55
0+00		7.15	7.22	7.28	7.31	7.31
0+50		8.47	8.52	8.57	8.61	8.63
1+00		9.69	9.72	9.79	9.84	9.85
1+50		11.14	11.17	11.22	11.27	11.29
2+00		12.59	12.67	12.73	12.79	12.82
2+50		14.02	14.09	14.13	14.15	14.18
3+00		15.38	15.43	15.49	15.53	15.56
3+50		16.68	16.75	16.79	16.82	16.83
4+00		17.95	18.01	18.06	18.09	18.12
4+50		19.25	19.29	19.37	19.43	19.45
5+00		20.31	20.34	20.41	20.47	20.52
5+25		20.97	21.00	21.04	21.08	21.11

NOTES T.B.M. TOP OF PLASTIC REBAR CAP PROPERTY CORNER STA. ±0+60 NORTH R.O.W. ASSUMED ELEV. = 10.00 FT.
T.B.M. PAINT MARK ON TOP OF EAST END OF CONC. DRIVEWAY CULVERT STA. ±0+40 SOUTH R.O.W., ELEV. = 7.63 FT, INST LOC 1 = ± 1+30 MIDLANE, T.P. HUB @ 2+40, ELEV = 13.415
INST. LOC 2 = ± 3+60 MIDLANE, TIE-IN 9.99 = -0.01" O.K.

LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 11/29/99
SURVEYOR JLP, TJM

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 08
LAYER BASE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25		6.84	6.93	6.94	6.99	7.04
0+00		7.52	7.56	7.61	7.66	7.68
0+50		8.81	8.84	8.88	8.90	8.89
1+00		10.12	10.18	10.24	10.28	10.31
1+50		11.52	11.60	11.65	11.69	11.72
2+00		13.03	13.07	13.11	13.13	13.17
2+50		14.42	14.48	14.52	14.57	14.60
3+00		15.80	15.86	15.92	15.97	15.99
3+50		17.11	17.18	17.24	17.29	17.32
4+00		18.38	18.44	18.50	18.55	18.57
4+50		19.62	19.67	19.74	19.78	19.80
5+00		20.80	20.82	20.87	20.91	20.91
5+25		21.35	21.36	21.39	21.41	21.40

NOTES B.M.: TOP OF PLASTIC CAP ON REBAR PROPERTY CORNER, STA. ± 0+60, NORTH R.O.W., ASSUMED ELEV. 10.00 FT. (INST @ 1+42)
T.B.M.: PAINT MARK ON TOP OF EAST END OF CONC. DRIVEWAY CULVERT, STA. ± 0+40 SOUTH R.O.W., ELEV. = 7.63 FT
T.P. & HUB ± STA. 2+35, ELEV. = 4.10 FT; INST @ STA. 3+60 &, TIE-IN - FLAT

LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 12/13/1999
SURVEYOR MJH/JFD

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 08
LAYER BASE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25						
0+00		7.21	7.39	~~7.39~~ 7.43	7.43	7.46
0+50		8.47	8.64	8.71	8.77	8.78
1+00		9.88	10.10	10.14	10.18	10.20
1+50		11.30	11.47	11.53	11.54	11.52
2+00		12.74	12.90	12.99	12.99	13.02
2+50						
3+00						
3+50						
4+00						
4+50						
5+00						
5+25						

NOTES T.B.M. TOP OF PLASTIC CAP ON REBAR PROPERTY CORNER, STA. ± 0+60, NORTH R.O.W., ASSUMED ELEV. = 10.00 FT.; TIE-IN-FLAT
→ SUPPLEMENTAL READINGS TO ACCOUNT FOR SUBGRADE AND BASE RECONSTRUCTION AND RE-LEVEL. BASE THICKNESSES FOR THE ABOVE STATIONS CAN NOT BE RELIED ON BECAUSE NEW SUBGRADE ELEVATIONS WERE NOT OBTAINED.

LTPP-SPS CONSTRUCTION DATA
LAYER THICKNESS MEASUREMENTS
DATE 01/05/1999
SURVEYOR MJH/JLP

STATE CODE 48
SPS PROJECT CODE A8
TEST SECTION Nº. 08
LAYER PCC SURFACE

STATION Nº.	OFFSET (Meters)	0.1	0.83	1.65	2.48	3.30
	(Inches)	4	32.5	65	97.5	130
		OUTSIDE		MID LANE		℄ ROADWAY
0-25		7.79	7.86	7.91	7.96	7.99
0+00		8.35	8.42	8.47	8.54	8.58
0+50		9.66	9.70	9.76	9.82	9.85
1+00		11.04	11.11	11.17	11.21	11.25
1+50		12.47	12.53	12.58	12.63	12.67
2+00		13.90	13.96	14.02	14.07	14.12
2+50		15.36	15.41	15.48	15.52	15.54
3+00		16.76	16.82	16.87	16.93	16.96
3+50		18.06	18.13	18.21	18.25	18.28
4+00		19.31	19.38	19.43	19.50	19.55
4+50		20.53	20.60	20.66	20.71	20.75
5+00		21.77	21.81	21.86	21.90	21.92
5+25		22.42	22.46	22.48	22.50	22.51

NOTES T.B.M. TOP OF PLASTIC CAP ON REBAR PROPERTY CORNER, STA. ± 0+60, NORTH R.O.W., ASSUMED ELEV. = 10.00 FT.
T.B.M. PAINT MARK ON TOP OF EAST END OF CONC. DRIVEWAY CULVERT, STA. ± 0+40 SOUTH R.O.W., ELEV. = 7.63 FT. ; TP #1 @ ±2+50, ELEV. = 15.45
TIE IN - PLASTIC CAP, ELEV. = 10.01 FT ✓ OK.

APPENDIX C

MATERIALS SAMPLING AND TESTING PLAN

Long-Term Pavement Performance

LTPP Southern Regional Office - 8240 Mopac, Suite 220 - Austin, Texas 78759 - Tel 512-346-0870 - Fax 512-346-8750

22 March 2000

Mr. Ali Bashi, P.E.
Texas Department of Transportation
1502 Holland Road
Belton, Texas 76513

Subject. Material Sampling and Testing Plan for the Texas SPS-8 (48A8) Project

Dear Mr. Bashi:

Enclosed is a copy of the newly revised Material Sampling and Testing Plan for the test sections built on FM-2670 in Bell County. Please feel free to contact me with any questions or comments you have on this plan, or the project in general.

If you require any additional information, please give me a call.

Sincerely,

Michael J. Harrell, E.I.T.
Graduate Engineer, SRCO

MJH:dmj

Enclosure: As stated.

cc.w/Enc: Terry Niemann, Fugro South-Waco

MATERIAL SAMPLING
AND
TESTING PLAN

TEXAS SPS-8 PROJECT 48A800
FM-2670
BELL COUNTY, TEXAS

PREPARED BY:

FUGRO-BRE, INC.
FHWA/LTPP SOUTHERN REGION COORDINATION OFFICE
8240 MOPAC, SUITE 220
AUSTIN, TEXAS 78759

REVISED MARCH AND JULY 1999
AND
MARCH 2000

MATERIAL SAMPLING AND TESTING PLAN
TEXAS SPS-8 PROJECT (48A800)
FM-2670
BELL COUNTY, TEXAS

INTRODUCTION

As part of their participation in the FHWA/LTPP studies, the State of Texas has elected to construct an SPS-8 project to study the environmental effects in the absence of heavy loads. This project will consist of two test sections on FM-2670, in Bell County, Texas. It is the intent of this document to provide a complete plan for the material sampling, testing, and laboratory material testing that will occur as a part of this project.

This document has been prepared in accordance with guidelines provided by the Federal Highway Administration entitled "Specific Pavement Studies Material Sampling and Testing Requirements for Experiment SPS-8, Study of Environmental Effects in the Absence of Heavy Loads, August 1992". Recognizing the apparent variability in the construction of roadway projects, the goal of this effort is to develop a sampling and testing plan for the project materials that will be consistent with other projects in this experiment, and therefore make the information obtained suitable for analysis.

The objective of the SPS-8 study is to investigate the performance of selected flexible and rigid pavement structures constructed on different subgrade types in different environmental regions. The factors addressed in this study include pavement type, surface and base thickness, and subgrade classification. Texas' involvement in the study will provide critical information in the dry-no freeze environmental zone, on active subgrade soil. The data produced by this experiment will be used to evaluate existing design methods and performance equations. The interaction of the factors previously discussed will be determined in combination with the effect of environmental region and soil type. The effects of these factors will be studied under realistic performance conditions with significant materials and construction control. Herein lies the need for a sampling and testing plan, provided in the following pages.

This sampling and testing plan has been developed by Fugro-BRE, Inc., the Southern Region Coordination Office under contract to the Federal Highway Administration. If, during the construction activities, any questions arise regarding the sampling and/or testing to be conducted, one should first coordinate these questions with the Texas Department of Transportation (Texas DOT), who may refer them to the Southern Region Coordination Office.

This document has been prepared in three distinct parts, each covering a particular area of this rather formidable exercise. The three sections are:

A. General Layout Information

B. Materials Sampling and Testing

C. Laboratory Material Testing

The General Layout section provides tables and figures of the layout showing the two test sections along the roadway and the layer structure for these test sections.

The Material Sampling and Testing section defines in detail all of the material samples to be obtained, testing to be performed in the field, and provides an itemized list showing where each sample is to be shipped for laboratory testing.

Finally, the Laboratory Material Testing section outlines the laboratory material test program to be conducted and provides tracking charts showing the testing to be performed on each sample of each material in each laboratory.

SECTION A

GENERAL LAYOUT INFORMATION

SECTION A

GENERAL LAYOUT INFORMATION

This section of the plan provides a description of the SPS-8 project in terms of the location of the test sections along the roadway. Table A-1 lists the test sections in order of increasing station, providing an indication of the cross-section of each test section. Table A-2 tracks the test sections from the beginning of the first section at metric station 5+445.0 to the end of the last section at station 5+782.0 This table indicates transition areas between sections and the variation of pavement layer materials within these transitions. Figure A-1 depicts the layout of the test sections along the roadway and shows the variation of material type and layer thickness.

TABLE A-1. TEST SECTION LAYOUT

Section (Cell ID)	Cross Section	Begin Station	End Station
48A807	8″ PCC Surface	5+445.0	5+598.0
	6″ DGAB Base		
48A808	11″ PCC Surface	5+629.0	5+782.0
	6″ DGAB Base		

TABLE A-2. ORDERING OF SECTIONS ALONG CENTER LINE STATIONING

Begin Sta.	End Sta.	Section ID	Thickness (In.)	
			PCC Surface	DGAB
5+445.0	5+598.0	48A807	8	6
5+629.0	5+782.0	48A808	11	6

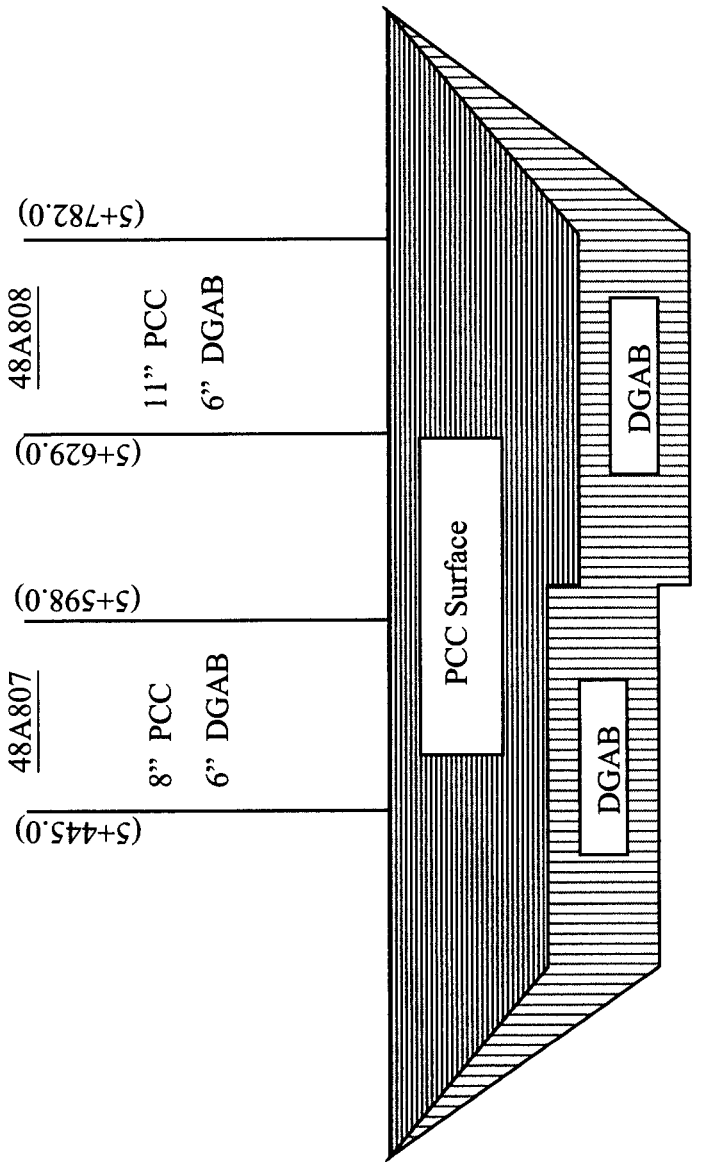


FIGURE A-1. LAYOUT OF TEST SECTIONS TEXAS SPS-8 (48A800)

SECTION B

MATERIAL SAMPLING AND TESTING

SECTION B

MATERIAL SAMPLING AND TESTING

This section of the plan provides for the material sampling and testing activities that occur in the field. Tables B-1 and B-2 provide the scope of the material sampling and field testing activities, respectively. Table B-3 describes special sampling needs for the Materials Reference Library and provides contact information to coordinate sample shipping arrangements.

Figures B-1 through B-8 show the locations and numbering scheme for the many samples and tests scheduled. Figures B-2 through B-6 show the sampling and testing to occur for each stage of the paving, while Figures B-7 and B-8 show all sampling and testing scheduled for each test section.

Finally, Tables B-4 and B-5 list samples to be shipped to the state laboratory (or their designee), and those samples to be shipped to the FHWA/LTPP testing contractor, respectively. Shipment of samples to the FHWA/LTPP testing contractor, Braun Intertec in Minneapolis, Minnesota, should be coordinated through the Southern Region Coordination Office.

TABLE B-1. SCOPE OF MATERIAL SAMPLING

Material And Sample Description	Nº. Of Samples	Sample Location
Portland Cement Concrete		
Coring - 4" Diam. Cores	26	C1-C26
Bulk Sampling (Molded into test specimens)	3	FC1, FC2, FC3
Dense-Graded Aggregate Base		
Bulk Sampling (400 lb/sample)	2	B4-B5
Moisture Content Samples (Jars)	2	B4-B5
Subgrade		
Thin-Walled Tubes (2 per hole)	12	A1-A6
Bulk Sampling (400 lb/sample)	3	B1-B3
Moisture Content Samples (Jars)	9	A1-A6, B1-B3
Permeability	2	A2
Expansion Index	3	B1,B3

TABLE B-2. SCOPE OF FIELD TESTING

Material And Test Description	Nº. Of Tests	Sample Location
Portland Cement Concrete		
Air Content	3	FC1,FC2,FC3
Slump	3	FC1,FC2,FC3
Temperature	3	FC1,FC2,FC3
Dense-Graded Aggregate Base		
In Situ Density, Moisture Content (Nuclear Gauge)	6	T10-T15
Plate-Bearing Test	2	PB3,PB4
Subgrade		
In Situ Density, Moisture Content (Nuclear Gauge)	9	T1-T9
Shoulder Auger Probe	2	S1,S2
Plate-Bearing Test	2	PB1,PB2

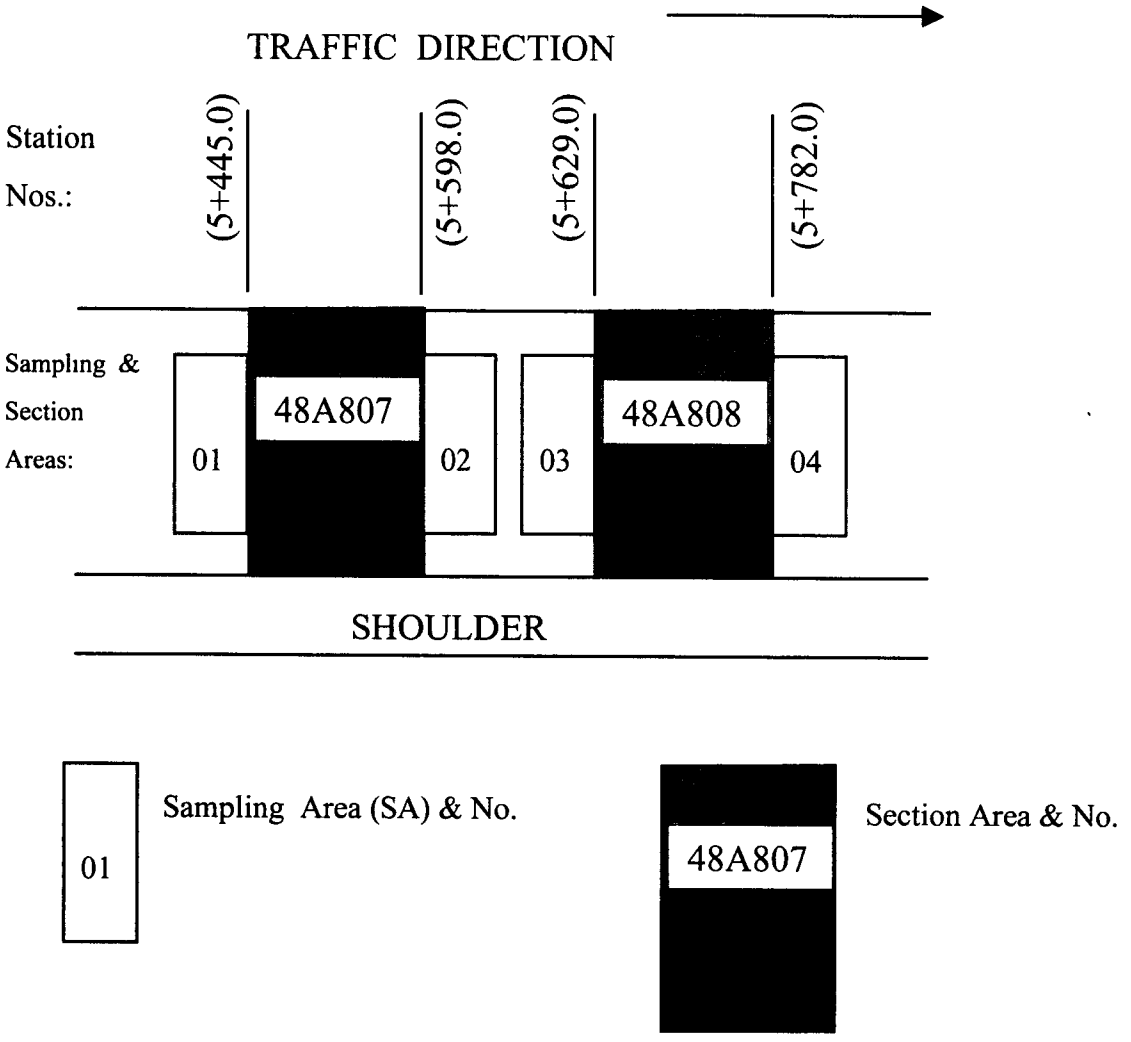
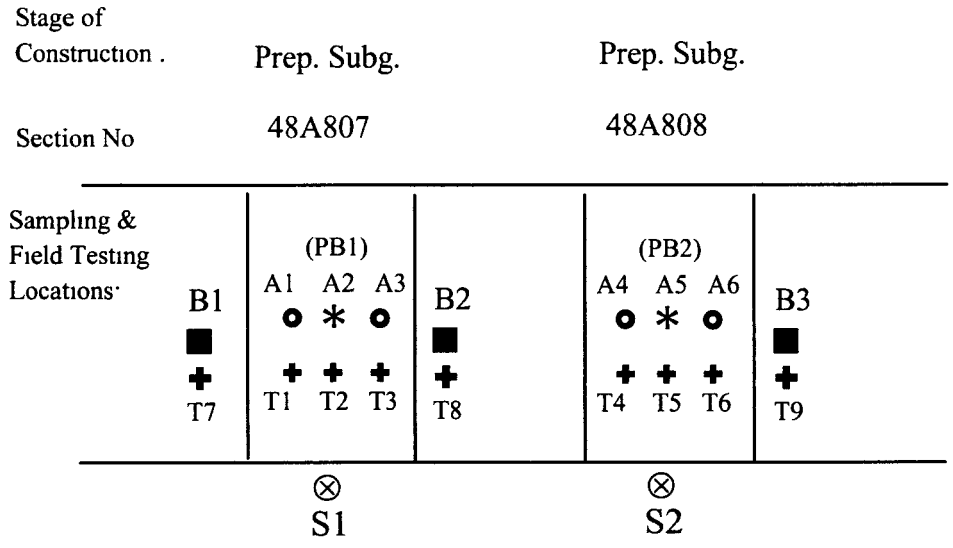


FIGURE B-1. SITE LAYOUT WITH SAMPLING AREAS TEXAS SPS-8 (48A800)

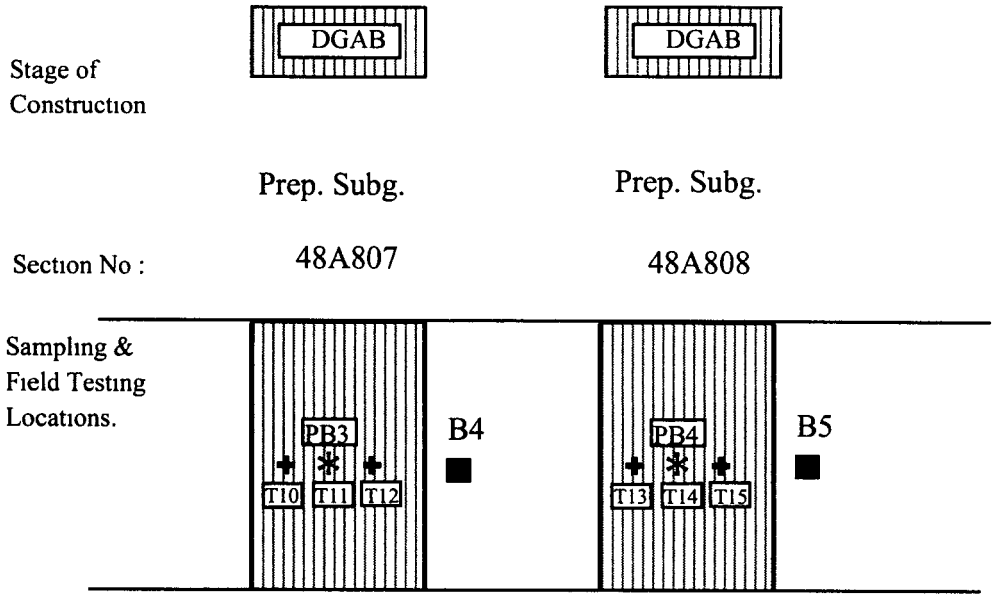


Legend:

- ✚ In Situ Density and Moisture Content Test Locations (T1 - T9)
- ■ 2' x 2' Bulk Sampling Locations (B1 - B3)
- o Shelby Tube Sampling to 4' Below Top of Subgrade (A1 - A6)
- ∗ Plate Bearing Tests (PB1, PB2) (at same locations as and performed before Shelby Tube Sampling tests (A2, A5))
- ⊗ Shoulder Probe to 20' Below Top of Subgrade (S1 - S2)

Prep. Subg. - Prepared Subgrade

FIGURE B-2. SAMPLING AND TESTING LOCATIONS FOR SUBGRADE TEXAS SPS-8 (48A800)



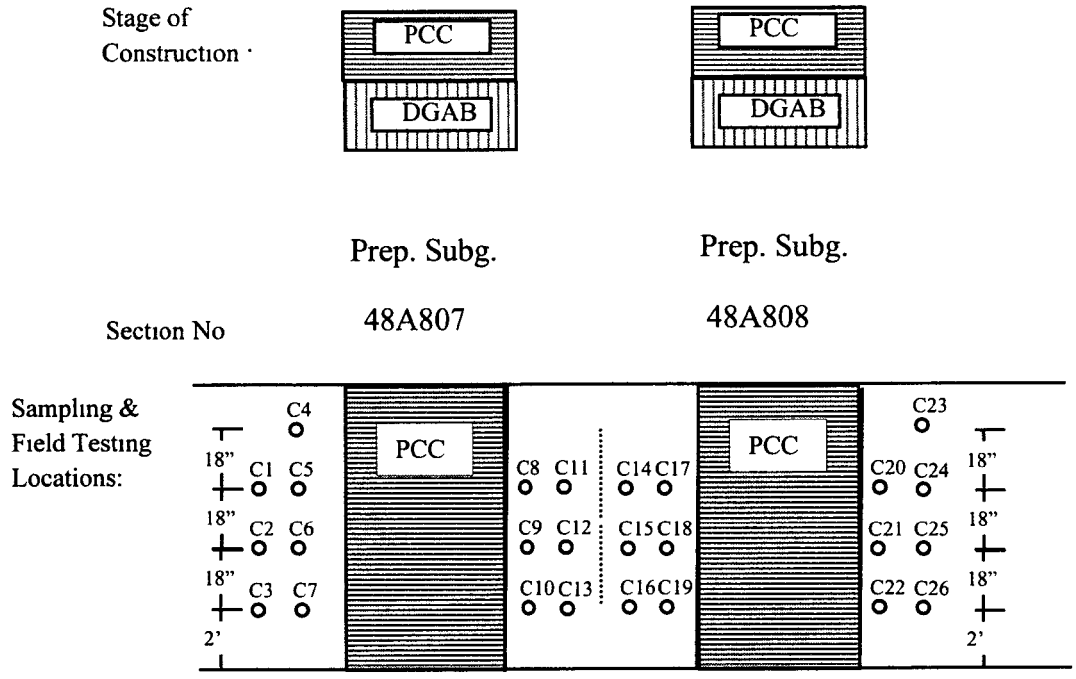
Legend:

- ✚ In Situ Density and Moisture Content Test Locations (T10 - T15)
- ■ 2' x 2' Bulk Sampling Locations (B4 - B5)
- ✱ Plate Bearing Test Locations (PB3, PB4) (at same location as and performed before In Situ Density Tests (T11, T14))

DGAB - Dense Graded Aggregate Base

Prep. Subg. - Prepared Subgrade

FIGURE B-3. SAMPLING AND TESTING LOCATIONS FOR DGAB TEXAS SPS-8 (48A800)



Legend: O 4" Diameter Core of PCC Surface (C1 - C26)

14 day - C1, C5, C10, C14, C20, C23

28 day - C2, C3, C6, C9, C11, C12, C15, C18, C21, C24, C26

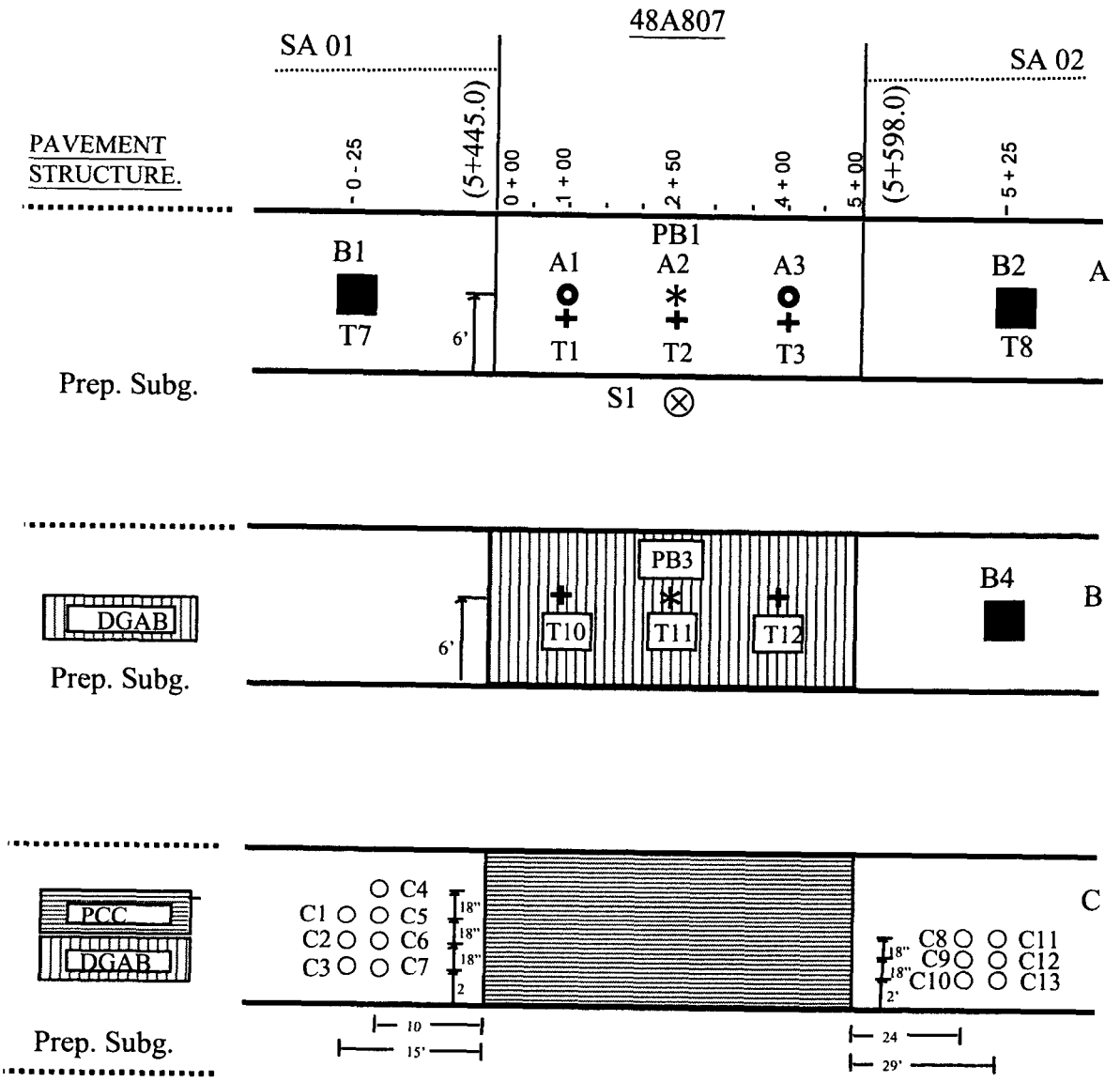
1 year - C4, C7, C8, C13, C16, C17, C19, C22, C25

PCC - Portland Cement Concrete

DGAB - Dense Graded Aggregate Base

Prep. Subg. - Prepared Subgrade

FIGURE B-4. SAMPLING AND TESTING LOCATIONS FOR SURFACE MATERIALS TEXAS SPS-8 (48A800)



A Testing on Prepared Subgrade (T1-T3, A1-A3, PB1, B1-B2, S1)

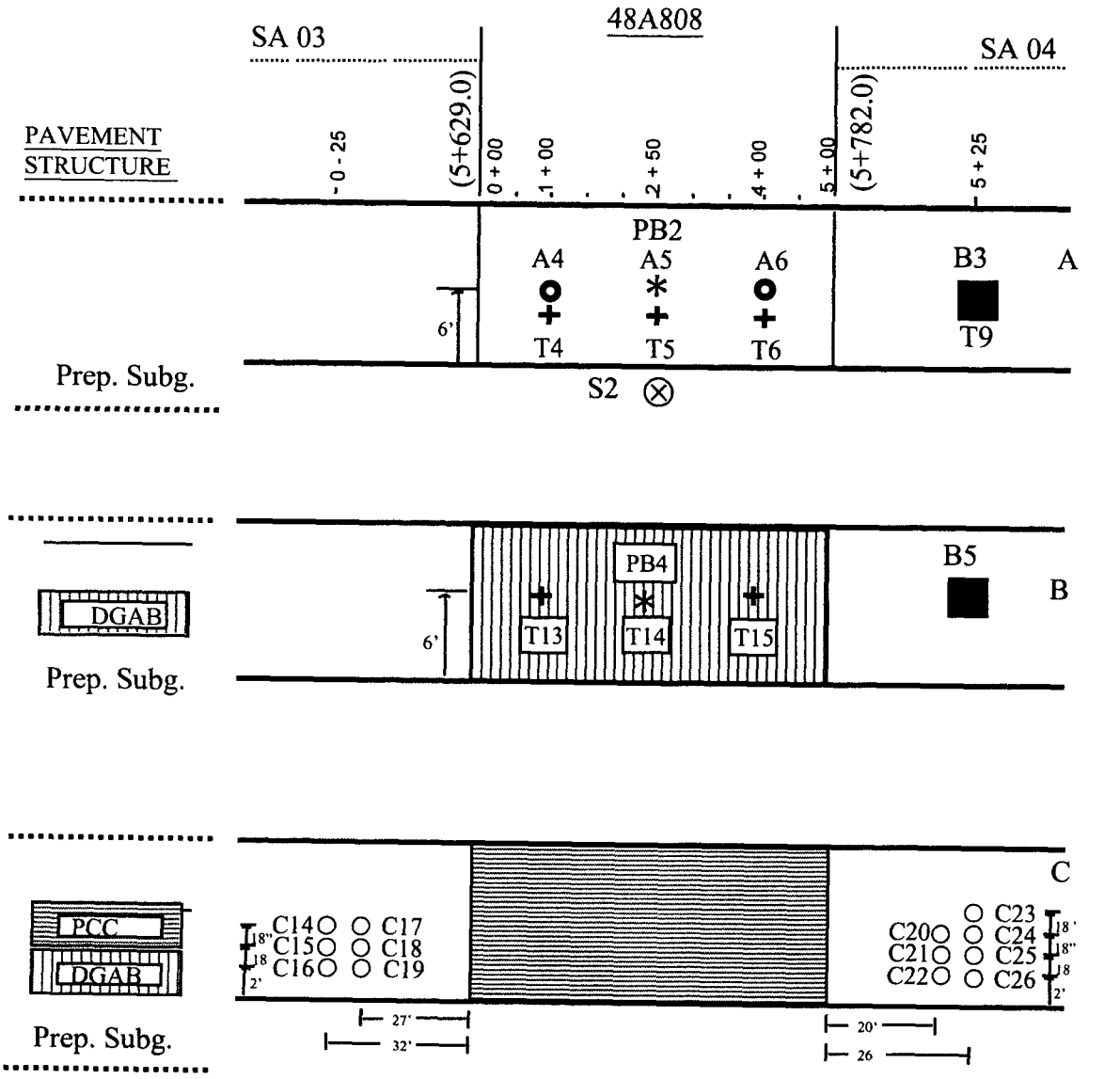
B Testing on compacted DGAB (T10 - T12, PB3, B4)

C 4 in (0.102 m) Coring of PCC surface (C1 - C13)

14 day	- C1, C5, C10
28 day	- C2, C3, C6, C9, C11, C12
1 year	- C4, C7, C8, C13

* Plate Bearing tests (PB1, PB3) (at same locations and before In Situ Density test (T11) or Shelby Tube Sampling (A2))

FIGURE B-5. SAMPLING AND TESTING PLAN FOR TEST SECTION 48A807



A Testing on Prepared Subgrade (T4-T6, T9, A4-A6, PB2, B3, S2)

B Testing on compacted DGAB (T13 - T15, PB4, B5)

C 4 in (0.102 m) Coring of PCC surface (C14 - C26)

14 day	- C14, C20, C23
28 day	- C15, C18, C21, C24, C26
1 year	- C16, C17, C19, C22, C25

* Plate Bearing (PB2, PB4) tests (at same locations and before In Situ Density (T5, T14) test and Shelby Tube Sampling (A5))

FIGURE B-6. SAMPLING AND TESTING PLAN FOR TEST SECTION 48A808

TABLE B-3. SAMPLES TO BE SHIPPED TO THE STATE LABORATORY (OR THEIR DESIGNEE)

Sample Location	Sample Number	Lab Test Number	Type of Sample
Portland Cement Concrete			
C1	CP01	1	102 mm (4 in.) Core
C2	CP02	1	102 mm (4 in.) Core
C3	CP03	1	102 mm (4 in.) Core
C4	CP04	1	102 mm (4 in.) Core
C5	CP05	1	102 mm (4 in.) Core
C6	CP06	1	102 mm (4 in.) Core
C7	CP07	1	102 mm (4 in.) Core
C8	CP08	2	102 mm (4 in.) Core
C9	CP09	2	102 mm (4 in.) Core
C10	CP10	2	102 mm (4 in.) Core
C11	CP11	2	102 mm (4 in.) Core
C12	CP12	2	102 mm (4 in.) Core
C13	CP13	2	102 mm (4 in.) Core
C14	CP14	1	102 mm (4 in.) Core
C15	CP15	1	102 mm (4 in.) Core
C16	CP16	1	102 mm (4 in.) Core
C17	CP17	1	102 mm (4 in.) Core
C18	CP18	1	102 mm (4 in.) Core
C19	CP19	1	102 mm (4 in.) Core
C20	CP20	2	102 mm (4 in.) Core
C21	CP21	2	102 mm (4 in.) Core
C22	CP22	2	102 mm (4 in.) Core
C23	CP23	2	102 mm (4 in.) Core
C24	CP24	2	102 mm (4 in.) Core
C25	CP25	2	102 mm (4 in.) Core
C26	CP26	2	102 mm (4 in.) Core

TABLE B-3. SAMPLES TO BE SHIPPED TO THE STATE LABORATORY (OR THEIR DESIGNEE) (Continued)

Sample Location	Sample Number	Lab Test Number	Type of Sample
FC1	GX01	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GX02	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GY01	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GY02	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GZ01	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GZ02	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	FX01	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
	FY01	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
	FZ01	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
FC2	GX03	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GX04	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GY03	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GY04	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GZ03	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GZ04	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	FX02	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
	FY02	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
	FY02	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
FC3	GX05	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GX06	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GY05	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GY06	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GZ05	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	GZ06	3	152 mm × 305 mm (6 in. × 12 in.) cylinder
	FX03	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
	FY03	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam
	FZ03	3	152 mm × 152 mm × 508 mm (6 in. × 6 in. × 20 in.) beam

TABLE B-3. SAMPLES TO BE SHIPPED TO THE STATE LABORATORY (OR THEIR DESIGNEE) (Continued)

Sample Location	Sample Number	Lab Test Number	Type of Sample
Dense-Graded Aggregate Base			
B4	BG01	2	45 kg (100 lb) bulk sample
B5	BG02	2	45 kg (100 lb) bulk sample
Subgrade			
B1	BS01	1	45 kg (100 lb) bulk sample
B2	BS02	2	45 kg (100 lb) bulk sample
B3	BS03	2	45 kg (100 lb) bulk sample
A2	TS03, TS04	3	Thin-Wall Tube
A4	TS07, TS08	3	Thin-Wall Tube
A6	TS11, TS12	3	Thin-Wall Tube

TABLE B-4. SAMPLES TO BE SHIPPED TO THE FHWA-LTPP TESTING CONTRACTOR LABORATORY

Sample Location	Sample Number	Lab Test Number	Type of Sample
Portland Cement Concrete			
No Portland Cement Concrete Samples are sent to the FHWA-LTPP Testing Laboratory.			
Dense-Graded Aggregate Base			
B4	BG01	2	136 kg (300 lb) Bulk Sample
B5	BG02	2	136 kg (300 lb) Bulk Sample
B4	MG01	2	Moisture Content Jar Sample
B5	MG02	2	Moisture Content Jar Sample
Subgrade			
B1	BS01	1	136 kg (300 lb) Bulk Sample
B2	BS02	2	136 kg (300 lb) Bulk Sample
B3	BS03	2	136 kg (300 lb) Bulk Sample
A1	TS01	3	Thin wall Tube Sample
A1	TS02	3	Thin wall Tube Sample
A3	TS05	3	Thin wall Tube Sample
A3	TS06	3	Thin wall Tube Sample
A5	TS09	3	Thin wall Tube Sample
A5	TS10	3	Thin wall Tube Sample
B1	MS01	1	Moisture Content Jar Sample
B2	MS02	2	Moisture Content Jar Sample
B3	MS03	2	Moisture Content Jar Sample

SECTION C

LABORATORY MATERIAL TESTING

SECTION C

LABORATORY MATERIAL TESTING

It is the intent of this section of the sampling and testing plan to provide an outline for the laboratory testing that is planned for the Texas SPS-8 project. The previous section ended with lists of samples to be shipped to each of two laboratories; the state designated laboratory and the FHWA/LTPP contracted laboratory. In this section, the tests to be performed on each sample are listed.

Table C-1 provides a reference project layer numbering scheme. It is important that the two laboratories reference the same layer by number to ensure meaningful results.

Table C-2 provides a listing of the tests to be performed for each material type and pavement layer, and the associated laboratory testing protocol. It is imperative that the protocols listed be strictly followed during testing.

Tables C-3 through C-5 provide tracking tables for the state designated laboratory for each material type. These tables itemize the testing to occur on each sample and provide an indication of whether the sample is to be disposed of. Tables C-6 through C-8 provide similar information for the FHWA/LTPP contracted laboratory.

TABLE C-1. PROJECT LAYER NUMBERING

Layer Nº.	LTPP Description	Texas Description
1	Subgrade	Subgrade
2	Dense Graded Aggregate Base (DGAB)	Flexible Base (Item 247) Type A, Grade 2
3	Portland Cement Concrete Surface	Concrete Pavement (Item 360)

TABLE C-2. SAMPLES TO BE USED FOR LABORATORY MATERIALS TESTING

Material Type and Properties	LTPP Designation	LTPP Protocol	Minimum Nº. of Tests per Layer	Sample Location	Test Conducted by: State	FHWA
SUBGRADE						
Sieve Analysis	SS01	P51	3	B1-B3		X
Hydrometer to 0.001 mm	SS02	P42	3	B1-B3		X
Atterberg Limits	SS03	P43	3	B1-B3		X
Classification	SS04	P52	3	B1-B3		X
(Visual-manual only on thin-wall tubes)			6	A1-A6	X	X
Moisture-Density Relations	SS05	P55	3	B1-B3		X
Resilient Modulus	SS07	P46	3	A1,A3,A5		X
Unit Weight (If thin-wall tube is not available, test is not conducted)	SS08	P56	3	A2,A4,A6	X	
Natural Moisture Content	SS09	P49	3	B1-B3		X
Unconfined Comp. Strength (If thin-wall tube is not available, test is not conducted)	SS10	P54	2	A2,A4	X	
Permeability	SS11	P57	1	A2	X	
In-Place Density and Moisture Content		SHRP-LTPP Method	12	B1-B3,T1-T9	X	
Depth to Rigid Layer		SHRP-LTPP Method	2	S1-S2	X	
Expansion Index	SS12	P60	3	B1-B3		?
Plate-Bearing Test (Rigid Sections Only)	SS06	P58	2	PB1,PB2	X	
DENSE GRADED AGGREGATE BASE						
Particle Size Analysis	UG01	P41	2	B4-B5		X
Sieve Analysis (Washed)	UG02	P41	2	B4-B5		X
Atterberg Limits	UG04	P43	2	B4-B5		X
Moisture-Density Relations	UG05	P44	2	B4-B5		X
Resilient Modulus	UG07	P46	2	B4-B5		X
Classification	UG08	P47	2	B4-B5		X
Permeability	UG09	P48	2	B4-B5	X	
Natural Moisture Content	UG10	P49	2	B4-B5		X
In-Place Density and Moisture Content		SHRP-LTPP Method	6	T10-T15	X	
Plate-Bearing Test (Rigid Sections Only)	SS06	P58	2	PB3,PB4	X	

TABLE C-2. SAMPLES TO BE USED FOR LABORATORY MATERIALS TESTING (Continued)

Material Type and Properties	LTPP Designation	LTPP Protocol	Minimum Nº. of Tests per Layer	Sample Location	Test Conducted by: State	FHWA
PORTLAND CEMENT CONCRETE - AS DELIVERED (Note 1)						
Compressive Strength	PC01	P61				
14 day			3	FC1,FC2,FC3	X	
28 day			3	FC1,FC2,FC3	X	
1 year			3	FC1,FC2,FC3	X	
Splitting Tensile Strength	PC02	P62				
14 day			3	FC1,FC2,FC3	X	
28 day			3	FC1,FC2,FC3	X	
1 year			3	FC1,FC2,FC3	X	
Flexural Strength	PC09	P69				
14 day			3	FC1,FC2,FC3	X	
28 day			3	FC1,FC2,FC3	X	
1 year			3	FC1,FC2,FC3	X	
Air Content		ASTM C231	3	FC1,FC2,FC3	X	
Slump		ASTM C143	3	FC1,FC2,FC3	X	
Temperature		ASTM C1064	3	FC1,FC2,FC3	X	
PORTLAND CEMENT CONCRETE - AS PLACED						
Visual Examination & Length Measurement	PC06	P66	26	All Cores (C1-C26)	X	
Compressive Strength	PC01	P61				
14 day			3	C1,C10,C20	X	
28 day			3	C2,C11,C21	X	
1 year			3	C4,C13,C22	X	
Splitting Tensile Strength	PC02	P62				
14 day			3	C5,C14,C23	X	
28 day			3	C6,C15,C24	X	
1 year			3	C8,C16,C25	X	
PCC Unit Weight	PC05	P65	9	Cores for Compressive Strength Testing	X	
Static Modulus of Elasticity	PC04	P64				
28 day			3	C3,C12,C26	X	
1 year			3	C7,C17,C19	X	
Air Content	PC08	P68				
28 day			1	C9	X	
Coefficient of Thermal Expansion	PC03	P63	1	C18	X	

Note 1: Each set of tests is made up of specimens molded from each of the three fresh concrete samples (FC1-FC3).

FOOTNOTE (1) REFERENCE SHEET FOR TABLES C-3 THROUGH C-8

(1) Sample Storage

a. Environmentally protected and controlled storeroom at 5-21°C (40-70°F).

b. Environmentally protected and controlled storeroom at 5-38°C (40-100°F).

c. Thin-walled tube samples of the subgrade that should be stored in a fully supported condition and at temperatures between 5°C (40°F) and 21°C (70°F) in an environmentally protected storeroom. They shall be stored on their ends and shall always be stored in a vertical position with respect to the longitudinal axis of the tube in the same orientation as that retrieved from the field.

d. Moist room at 23 ± 1.7°C (73.4 ± 3°F). Specimens shall have free water maintained on the entire surface at all times. The moist room shall meet the requirements of AASHTO Specification M201. specimens shall not be exposed to dripping or running water.

TABLE C-3. TRACKING TABLE OF PORTLAND CEMENT CONCRETE TESTING IN THE STATE LABORATORY (OR THEIR DESIGNEE)

Sample Location	Sample №.	Lab Test №.	Steps Involved in Laboratory Handling and Testing Sequence					
			Required Laboratory Tests Per Layer			Extra Sample	Sample Storage (1)	Sample Disposed ?
			First	Second	Third			
C1	CP01	1	PC06/P66	PC05/P65	PC01/P61 (14 day)	No	(b)	Yes
C2	CP02	1	PC06/P66	PC05/P65	PC01/P61 (28 day)	No	(b)	Yes
C3	CP03	1	PC06/P66	PC04/P64 (28 day)		No	(b)	Yes
C4	CP04	1	PC06/P66	PC05/P65	PC01/P61 (1 year)	No	(b)	Yes
C5	CP05	1	PC06/P66	PC02/P62 (14 day)		No	(b)	Yes
C6	CP06	1	PC06/P66	PC02/P62 (28 day)		No	(b)	Yes
C7	CP07	1	PC06/P66	PC04/P64 (1 year)		No	(b)	Yes
C8	CP08	2	PC06/P66	PC02/P62 (1 year)		No	(b)	Yes
C9	CP09	2	PC06/P66	PC08/P68		No	(b)	Yes
C10	CP10	2	PC06/P66	PC05/P65	PC01/P61 (14 day)	No	(b)	Yes
C11	CP11	2	PC06/P66	PC05/P65	PC01/P61 (28 day)	No	(b)	Yes
C12	CP12	2	PC06/P66	PC04/P64 (28 day)		No	(b)	Yes
C13	CP13	2	PC06/P66	PC05/P65	PC01/P61 (1 year)	No	(b)	Yes
C14	CP14	1	PC06/P66	PC02/P62 (14 day)		No	(b)	Yes
C15	CP15	1	PC06/P66	PC02/P62 (28 day)		No	(b)	Yes
C16	CP16	1	PC06/P66	PC02/P62 (1 year)		No	(b)	Yes
C17	CP17	1	PC06/P66	PC04/P64 (1 year)		No	(b)	Yes
C18	CP18	1	PC06/P66	PC03/P63		No	(b)	Yes
C19	CP19	1	PC06/P66	PC04/P64 (1 year)		No	(b)	Yes
C20	CP20	2	PC06/P66	PC05/P65	PC01/P61 (14 day)	No	(b)	Yes
C21	CP21	2	PC06/P66	PC05/P65	PC01/P61 (28 day)	No	(b)	Yes
C22	CP22	2	PC06/P66	PC05/P65	PC01/P61 (1 year)	No	(b)	Yes
C23	CP23	2	PC06/P66	PC02/P62 (14 day)		No	(b)	Yes
C24	CP24	2	PC06/P66	PC02/P62 (28 day)		No	(b)	Yes
C25	CP25	2	PC06/P66	PC02/P62 (1 year)		No	(b)	Yes
C26	CP26	2	PC06/P66	PC04/P64 (28 day)		No	(b)	Yes

TABLE C-3. TRACKING TABLE OF PORTLAND CEMENT CONCRETE TESTING IN THE STATE LABORATORY (OR THEIR DESIGNEE) (Continued)

Sample Location	Sample Nº.	Lab Test Nº.	Steps Involved in Laboratory Handling and Testing Sequence					
			Required Laboratory Tests Per Layer			Extra Sample	Sample Storage (1)	Sample Disposed ?
			First	Second	Third			
FC1	GX01	3	PC01/P61 (14 day)			No	(d)	Yes
	GX02	3	PC02/P62 (14 day)			No	(d)	Yes
	GY01	3	PC01/P61 (28 day)			No	(d)	Yes
	GY02	3	PC02/P62 (28 day)			No	(d)	Yes
	GZ01	3	PC01/P61 (1 year)			No	(d)	Yes
	GZ02	3	PC02/P62 (1 year)			No	(d)	Yes
	FX01	3	PC09/P69 (14 day)			No	(d)	Yes
	FY01	3	PC09/P69 (28 day)			No	(d)	Yes
	FZ01	3	PC09/P69 (1 year)			No	(d)	Yes
FC2	GX03	3	PC01/P61 (14 day)			No	(d)	Yes
	GX04	3	PC02/P62 (14 day)			No	(d)	Yes
	GY03	3	PC01/P61 (28 day)			No	(d)	Yes
	GY04	3	PC02/P62 (28 day)			No	(d)	Yes
	GZ03	3	PC01/P61 (1 year)			No	(d)	Yes
	GZ04	3	PC02/P62 (1 year)			No	(d)	Yes
	FX02	3	PC09/P69 (14 day)			No	(d)	Yes
	FY02	3	PC09/P69 (28 day)			No	(d)	Yes
	FZ02	3	PC09/P69 (1 year)			No	(d)	Yes
FC3	GX05	3	PC01/P61 (14 day)			No	(d)	Yes
	GX06	3	PC02/P62 (14 day)			No	(d)	Yes
	GY05	3	PC01/P61 (28 day)			No	(d)	Yes
	GY06	3	PC02/P62 (28 day)			No	(d)	Yes
	GZ05	3	PC01/P61 (1 year)			No	(d)	Yes
	GZ06	3	PC02/P62 (1 year)			No	(d)	Yes
	FX03	3	PC09/P69 (14 day)			No	(d)	Yes
	FY03	3	PC09/P69 (28 day)			No	(d)	Yes
	FZ03	3	PC09/P69 (1 year)			No	(d)	Yes

TABLE C-4. TRACKING TABLE OF DENSE GRADED AGGREGATE BASE TESTING IN THE STATE LABORATORY (OR THEIR DESIGNEE)

Sample Location	Sample №.	Lab Test №.	Steps Involved in Laboratory Handling and Testing Sequence						
			Required Laboratory Tests Per Layer				Extra Sample	Sample Storage (1)	Sample Disposed?
			First	Second	Third	Fourth			
B4	BG01	2	UG09/P48				No	(b)	Yes
B5	BG02	2	UG09/P48				No	(b)	Yes

TABLE C-5. TRACKING TABLE OF SUBGRADE TESTING IN THE STATE LABORATORY (OR THEIR DESIGNEE)

Sample Location	Sample Nº.	Lab Test Nº.	Steps Involved in Laboratory Handling and Testing Sequence						
			Required Laboratory Tests Per Layer				Extra Sample	Sample Storage (1)	Sample Disposed?
			First	Second	Third	Fourth			
B1	BS01	1	No testing - samples stored				Yes	(b)	No
B2	BS02	2	No testing - samples stored				Yes	(b)	No
B3	BS03	2	No testing - samples stored				Yes	(b)	No
A2	TS03	3	SS04/P52	SS08/P56	SS10/P54		No	(c)	Yes
A4	TS07	3	SS04/P52	SS08/P56	SS10/P54		No	(c)	Yes
A6	TS11	3	SS04/P52				No	(c)	Yes
A2	TS04	3					Yes	(c)	No
A4	TS08	3					Yes	(c)	No
A6	TS12	3					Yes	(c)	No

TABLE C-6. TRACKING TABLE OF PORTLAND CEMENT CONCRETE TESTING IN THE FHWA-LTPP TESTING CONTRACTOR LABORATORY

Sample Location	Sample №.	Lab Test №.	Steps Involved in Laboratory Handling and Testing Sequence						
			Required Laboratory Tests Per Layer				Extra Sample	Sample Storage (1)	Sample Disposed?
			First	Second	Third	Fourth			

No Portland Cement Concrete Testing
Will be Conducted by the FHWA-LTPP
Testing Contractor

TABLE C-7. TRACKING TABLE OF DENSE GRADED AGGREGATE BASE TESTING IN THE FHWA-LTPP TESTING CONTRACTOR LABORATORY

Sample Location	Sample Nº.	Lab Test Nº.	Steps Involved in Laboratory Handling and Testing Sequence								
			Required Laboratory Tests Per Layer						Extra Sample	Sample Storage (1)	Sample Disposed ?
			First	Second	Third	Fourth	Fifth	Sixth			
B4	BG01	2	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46	No	(b)	Yes
B5	BG02	2	UG01/P41	UG02/P41	UG04/P43	UG08/P47	UG05/P44	UG07/P46	No	(b)	Yes
B4	MG01	2	UG10/P49						No	(b)	Yes
B5	MG02	2	UG10/P49						No	(b)	Yes

TABLE C-8. TRACKING TABLE OF SUBGRADE TESTING IN THE FHWA-LTPP TESTING CONTRACTOR LABORATORY

Sample Location	Sample №.	Lab Test №.	Steps Involved in Laboratory Handling and Testing Sequence								
			Required Laboratory Tests Per Layer						Extra Sample	Sample Storage (1)	Sample Disposed ?
			First	Second	Third	Fourth	Fifth	Sixth			
B1	BS01	1	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55		No	(b)	Yes
B2	BS02	2	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55		No	(b)	Yes
B3	BS03	2	SS01/P51	SS02/P42	SS03/P43	SS04/P52	SS05/P55		No	(b)	Yes
A1	TS01	3	SS04/P52	SS07/P46					No	(c)	Yes
A3	TS05	3	SS04/P52	SS07/P46					No	(c)	Yes
A5	TS09	3	SS04/P52	SS07/P46					No	(c)	Yes
B1	MS01	1	SS09/P49						No	(b)	Yes
B2	MS02	2	SS09/P49						No	(b)	Yes
B3	MS03	2	SS09/P49						No	(b)	Yes
A1	TS02	3							Yes	(c)	No
A3	TS06	3							Yes	(c)	No
A5	TS10	3							Yes	(c)	No

APPENDIX D

CONSTRUCTION DATA

SPS-8 CONSTRUCTION DATA SHEET 1 PROJECT IDENTIFICATION	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [02]

*1. DATE OF DATA COLLECTION OR UPDATE (Month/Year) [02/00]

*2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER [09.]

*3. COUNTY OR PARISH [27.]

4. FUNCTIONAL CLASS (SEE TABLE A.2, APPENDIX A) [09.]

*5. ROUTE SIGNING (NUMERIC CODE) FARM-TO-MARKET (FM) [4.]
Interstate... 1 U.S... 2 State .. 3
Other... 4

*6. ROUTE NUMBER [2670.]

7. TYPE OF PAVEMENT (01 for Granular Base, 02 for Treated Base) [01.]

8. NUMBER OF THROUGH LANES (ONE DIRECTION) [1.]

*9. DATE OF CONSTRUCTION COMPLETION (Month/Year) [01/00]

*10. DATE OPENED TO TRAFFIC (Month/Year) [01/00]

11. CONSTRUCTION COSTS PER LANE MILE (In $1000) [1800.]

12. DIRECTION OF TRAVEL [1.]
East Bound... 1 West Bound.. 2 North Bound... 3
South Bound... 4

PROJECT STARTING POINT LOCATION

*13. MILEPOINT [.]

*14. ELEVATION [804]

*15. LATITUDE [30° 58' 45.00"]

*16. LONGITUDE [97° 46' 30.00"]

17. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS): [NEAR INTERSECTION OF FM 2670 AND TEXAS S.H. 195]

18. HPMS SAMPLE NUMBER (HPMS ITEM 28) [ ]

19. HPMS SECTION SUBDIVISION (HPMS ITEM 29) [.]

PREPARER Michael J. Harrell EMPLOYER FUGRO-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION	* STATE CODE [4 8] * SPS PROJECT CODE [A B] * TEST SECTION NO. [0 7]

*1. LANE WIDTH (FEET) [1 1.]

2. MONITORING SITE LANE NUMBER [1.]
(LANE 1 IS OUTSIDE LANE, NEXT TO SHOULDER
LANE 2 IS NEXT TO LANE 1, ETC.)

*3. SUBSURFACE DRAINAGE LOCATION [3.]
Continuous Along Test Section... 1 Intermittent... 2 None... 3

*4. SUBSURFACE DRAINAGE TYPE [1.]
No Subsurface Drainage. . 1 Longitudinal Drains... 2
Transverse Drains... 3 Drainage Blanket . 4 Well System.. 5
Drainage Blanket with Longitudinal Drains . 6
Other (Specify).. 7 _____

	SHOULDER DATA	INSIDE SHOULDER	OUTSIDE SHOULDER
*5.	SURFACE TYPE Turf... 1 Granular.... 2 Asphalt Concrete... 3 Concrete... 4 Surface Treatment... 5 Other (Specify)... 6 _____	[N.]	[5.]
*6.	TOTAL WIDTH (FEET)	[__ N.]	[__ 4.]
*7.	PAVED WIDTH (FEET)	[__ N.]	[__ 4.]
8.	SHOULDER BASE TYPE (CODES-TABLE A.6)	[__ N.]	[2 3.]
9.	SURFACE THICKNESS (INCHES)	[__ __ N]	[__ 0. 5]
10	SHOULDER BASE THICKNESS (INCHES)	[__ __. N]	[__ 6. 0]
11.	DIAMETER OF LONGITUDINAL DRAINPIPES (INCHES)		[__. N]
12.	SPACING OF LATERALS (FEET)		[__ __ N.]

PREPARER Michael D. Darnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 3 REFERENCE PROJECT STATION TABLE	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [00]

ORDER	*1 TEST SECTION ID NO	REFERENCE PROJECT STATION NUMBER		*4 CUT-FILL[1] TYPE
		*2 START	*3 END	
1	48A807	0+00	5+00	3
2	48A808	6+06	11+06	3
3		+	+	
4		+	+	
5		+	+	
6		+	+	
7		+	+	
8		+	+	
9		+	+	
10		+	+	
11		+	+	
12		+	+	
13		+	+	
14		+	+	
15		+	+	
16		+	+	
17		+	+	
18		+	+	
19		+	+	
20		+	+	

*5 INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT

ROUTE	PROJECT STATION NO.	RAMPS EXIT	RAMPS ENT	INTERSECTION STOP	INTERSECTION SIGNAL	INTERSECTION UNSIG
	+__					
	+__					
	+__					

Note 1. Indicate the type of subgrade construction the test section is located on:
Cut... 1 Fill... 2 At-Grade... 3 Cut, Fill, and At-Grade Combo... 4

If a section contains any combination of cut, fill and at-grade portions (code 4 above), enter the specific details of the cut, fill and at-grade locations on SPS-8 Construction Data Sheet 15.

PREPARER Michael J. Farrell EMPLOYER FUGRO-BRE DATE 4/28/00

SPS-8 CONSTRUCTION DATA SHEET 4 LAYER DESCRIPTIONS	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

*1 LAYER NUMBER	*2 LAYER DESCRIPTION	*3 MATERIAL TYPE CLASS	*4 LAYER THICKNESSES (Inches)			
			AVERAGE	MINIMUM	MAXIMUM	STD. DEV.
1	SUBGRADE(7)	[5 1]				
2	[0 5]	[2 3]	[6.2]	4.9	7.9	0.7
3	[0 3]	[0 5]	[6 7]	5.4	7.7	0.5
4	[ ]	[ ]	[.]	.	.	.
5	[ ]	[ ]	[.]	.	.	.
6	[ ]	[ ]	[.]	.	.	.
7	[ ]	[ ]	[.]	.	.	.
8	[ ]	[ ]	[.]	.	.	.
9	[ ]	[ ]	[.]	.	.	.
10	[ ]	[ ]	[.]	.	.	.
11	[ ]	[ ]	[.]	.	.	.
12	[ ]	[ ]	[.]	.	.	.
13	[ ]	[ ]	[.]	.	.	.
14	[ ]	[ ]	[.]	.	.	.
15	[ ]	[ ]	[.]	.	.	.

*5 DEPTH BELOW SURFACE TO "RIGID" LAYER (FEET) [1 . 0]
(Rock, Stone, Dense Shale)

NOTES:

1. Layer 1 is the subgrade soil, the highest numbered layer is the pavement surface.

2. Layer description codes:

Overlay.....01	Base Layer.....05	Porous Friction Course..09
Seal/Tack Coat.....02	Subbase Layer.....06	Surface Treatment.....10
Original Surface.....03	Subgrade.....07	Embankment (Fill).....11
HMAC Layer (Subsurface).04	Interlayer.....08	

3. The material type classification codes are presented in Tables A.5, A.6, A.7 and A.8 of the Data Collection Guide for Long Term Pavement Performance Studies, dated January 17, 1990.

4. Enter the average thickness of each layer and the minimum, maximum and standard deviation of the thickness measurements, if known.

PREPARER Michael J. Farrell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 12 LAYER THICKNESS MEASUREMENTS	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO [07]

SHEET 1 OF 2

STATION NUMBER	OFFSET (Inches)	LAYER THICKNESS MEASUREMENTS (Inches)			
		DENSE GRADED AGGREGATE BASE	PORTLAND CEMENT CONCRETE SURFACE	ASPHALT SURFACE AND BINDER	SURFACE FRICTION LAYER
0+00	4	7.3	5.8	.	
	33	7.8	5.9		
	65	7.8	6.0		
	98	7.9	5.9		
	130	7.4	6.2		.
0+50	4	5.3	7.1	.	.
	33	6.0	6.8	.	.
	65	6.5	6.6	.	
	98	6.5	6.5		.
	130	6.8	6.6		.
1+00	4	6.0	6.6	.	.
	33	6.6	6.4		.
	65	6.6	6.4	.	.
	98	6.5	6.6	.	
	130	6.4	7.3	.	.
1+50	4	5.3	5.4		.
	33	5.8	5.6	.	.
	65	6.0	5.8	.	.
	98	6.2	6.1	.	.
	130	6.4	6.5	.	.
2+00	4	6.1	6.7	.	.
	33	6.4	7.0	.	.
	65	6.2	7.0	.	.
	98	5.9	7.0	.	.
	130	5.9	7.1	.	.
2+50	4	5.0	6.7	.	.
	33	5.3	6.7	.	.
	65	5.5	6.7	.	.
	98	5.2	7.2	.	.
	130	5.2	7.7	.	.
3+00	4	5.8	6.7	.	.
	33	5.8	6.7	.	.
	65	5.5	6.6	.	.
	98	5.4	6.8	.	.
	130	4.9	7.6	.	.
LAYER NUMBER		02	03		

PREPARER Michael J. Vance EMPLOYER Fugro-BRE, Inc. DATE 02/25/00

SPS-8 CONSTRUCTION DATA SHEET 12 LAYER THICKNESS MEASUREMENTS	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [07]

SHEET 2 OF 2

STATION NUMBER	OFFSET (Inches)	LAYER THICKNESS MEASUREMENTS (Inches)			
		DENSE GRADED AGGREGATE BASE	PORTLAND CEMENT CONCRETE SURFACE	ASPHALT SURFACE AND BINDER	SURFACE FRICTION LAYER
3+50	4	5.9	6.8		
	33	6.0	6.6		
	65	6.0	6.4		
	98	6.2	6.4		
	130	5.8	6.7		
4+00	4	7.0	7.3		
	33	6.8	6.7		
	65	6.8	6.6		
	98	7.1	6.7		
	130	6.5	7.0		
4+50	4	6.1	7.3		
	33	6.2	7.2		
	65	6.1	7.2		
	98	6.0	7.4		
	130	5.9	7.4		
5+00	4	6.0	7.1		
	33	6.2	6.7		
	65	5.9	6.8		
	98	5.4	7.2		
	130	5.4	7.6		
__+__					
__+__					
__+__					
LAYER NUMBER		02	03		

PREPARER Michael J. Darnell EMPLOYER FUGRO-BRE, INC. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 13 UNBOUND AGGREGATE BASE MATERIAL PLACEMENT	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

*1 UNBOUND BASE MATERIAL PLACEMENT BEGAN (Month-Day-Year) [1 1-1 7-9 9]

*2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED (Month-Day-Year) [1 1-2 3-9 9]

*3. LAYER NUMBER (From Sheet 4) [2]

PRIMARY COMPACTION EQUIPMENT

*4. CODE TYPE [1]

COMPACTION TYPE CODES
Pneumatic - Tired.. 1 Steel Wheel Tandem.. 2 Single Drum Vibr.... 3
Double Drum Vibr 4
Other (Specify).. 5 _____

*5. GROSS WEIGHT (TONS) [1 2.0]

*6. LIFT THICKNESSES
Nominal First Lift Placement Thickness (inches) [0 6]
Nominal Second Lift Placement Thickness (inches) [__ __]
Nominal Third Lift Placement Thickness (inches) [__ __]
Nominal Fourth Lift Placement Thickness (inches) [__ __]

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

7. *SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS,* ETC.) _____

PREPARER Michael J. Farnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 14 SUBGRADE PREPARATION	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

*1 SUBGRADE PREPARATION BEGAN (Month-Day-Year) [1 1-0 9-9 9]

*2. SUBGRADE PREPARATION COMPLETED (Month-Day-Year) [1 1-1 2-9 9]

PRIMARY COMPACTION EQUIPMENT

*3 CODE TYPE [1]

COMPACTION EQUIPMENT TYPE CODES
Sheepsfoot... 1 Pneumatic Tired... 2 Steel Wheel Tandem... 3
Single Drum Vibr.... 4 Double Drum Vibr.. . 5
Other (Specify)... 6 _____

*4 GROSS WEIGHT (TONS) [1 3.8]

		TYPE	PERCENT
*5	STABILIZING AGENT 1	[__]	[__ __.__]
*6.	STABILIZING AGENT 2	[__]	[__ __.__]

STABILIZING AGENT TYPE CODES
Portland Cement... 1 Lime... 2 Fly Ash, Class C... 3
Fly Ash, Class N... 4
Other (Specify)... 5 _____

*7. TYPICAL LIFT THICKNESS (INCHES) [__ __]
(For Fill Sections Only)

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

8. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____

PREPARER Michael D Farrell EMPLOYER Fugro-BRE, Inc. DATE 02/25/00

SPS-8 CONSTRUCTION DATA SHEET 15 CUT-FILL SECTION LOCATIONS	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO [0 7]

ORDER	*1 CUT-FILL TYPE[1]	TEST SECTION STATION NUMBER	
		*2 START	*3 END
1	3	0 + 0 0	5 + 0 0
2		+	+
3		+	+
4		+	+
5		+	+
6		+	+
7		+	+
8		+	+
9		+	+
10		+	+

NOTES:

1. Indicate the type of subgrade construction with one of the following:

   Cut... 1 Fill... 2 At-Grade... 3

2. Use one line for each cut, fill or at-grade zone present within the section boundaries.

PREPARER Michael J. Skene II EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 16 SUBGRADE EXCAVATION AND BACKFILLING SKETCH	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

NOT APPLICABLE

PREPARER Michael J Farrell EMPLOYER FUGRO-BRE, INC. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 17 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA	* STATE CODE [48] * SPS PROJECT CODE [18] * TEST SECTION NO. [07]

* 1 LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

* 2. AVERAGE CONTRACTION JOINT SPACING (Feet) [15.0]

3. (RANDOM JOINT SPACING, IF ANY. NONE)

* 4. SKEWNESS OF JOINTS (ft/lane) [.N]

* 5 TRANSVERSE CONTRACTION JOINT LOAD TRANSFER SYSTEM [1]
Round Dowels..... 1
Aggregate Interlock.... 2
Other (Specify) _____ 3

* 6. ROUND DOWEL DIAMETER (Inches) 7/8" [0.88]

* 7. DOWEL SPACING (Inches) [12.]

8. DISTANCE OF NEAREST DOWEL FROM OUTSIDE LANE-SHOULDER EDGE (Inches) [6.5]

9. DOWEL LENGTH (Inches) [17.]

10. DOWEL COATING [5]
Paint and/or Grease ... 1
Plastic..... 2
Monel..... 3
Stainless Steel..... 4
Epoxy..... 5
Other (Specify) _____ 6

11. METHOD USED TO INSTALL MECHANICAL LOAD TRANSFER DEVICES [1]
Preplaced on Baskets..... 1
Mechanically Installed..... 2
Other (Specify) _____ 3

12. DOWEL ALIGNMENT CHECKED BEFORE PLACEMENT (Y/N) [Y]

13. DOWEL ALIGNMENT CHECKED AFTER PLACEMENT (Y/N) [N]

If Yes, describe method used _____
(e.g. Pachometer, Ground Penetrating Radar)

PREPARER Michael J. Darnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 18 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA (CONTINUED)	* STATE CODE [4 8] * SPS PROJECT CODE [4 8] * TEST SECTION NO. [0 7]

* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

* 2 METHOD USED TO FORM TRANSVERSE JOINTS [1]
Sawed..... .... 1 Metal Insert.....3
Plastic Insert..... 2
Other (Specify) _____ 4

* 3. TYPE OF LONGITUDINAL JOINT (BETWEEN LANES) [1]
Butt .... 1 Insert Weakened Plane..... 3
Sawed Weakened Plane..... 2
Other (Specify) _____ 4

* 4. TYPE OF SHOULDER-TRAFFIC LANE JOINT [4]
Butt .... 1 Insert Weakened Plane .. 3
Sawed Weakened Plane... .. 2
Other (Specify) NONE, SHOULDER SURFACE TREATMENT ONLY 4

*5. AVERAGE DEPTH OF SAWCUT, FROM MEASUREMENTS (Inches) ... 2 5/8" ..... [2.6 3]

*6. TIME INTERVAL BETWEEN CONCRETE PLACEMENT AND SAWCUT (HOURS)..... [2 4.]

7. TRANSVERSE JOINT SEALANT TYPE (AS BUILT) [4]
Preformed (Open Web)..... 1 Rubberized Asphalt..... 3
Asphalt..... .... 2 Low-Modulus Silicone..... 4
Other (Specify) _____ 5

TRANSVERSE JOINT SEALANT RESERVOIR (AS BUILT)

8. WIDTH, (Inches) ..... 3/8" ..... [0.3 8]

9. DEPTH, (Inches) ..... 1 3/4" ..... [1.7 5]

LONGITUDINAL JOINT SEALANT RESERVOIR (AS BUILT)

10. WIDTH, (Inches) ..... [0.3 8]

11. DEPTH, (Inches) ..... [1.7 5]

12. BETWEEN LANE TIE BAR DIAMETER (Inches) #5 [0.6 3]

13. BETWEEN LANE TIE BAR LENGTH (Inches) [4 0.]

14. BETWEEN LANE TIE BAR SPACING (Inches) [3 9.0]

SHOULDER-TRAFFIC LANE JOINT SEALANT RESERVOIR (AS BUILT)

15. WIDTH, (Inches) ..... NONE ..... [_._ N]

16. DEPTH, (Inches) ..... NONE ..... [_._ N]

PREPARER Michael J Vanell EMPLOYER FUGRO-BRE, INC. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 19 PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

*1 LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

MIX DESIGN (OVEN DRIED WEIGHT - PER CUBIC YARD)

*2. Coarse Aggregate (Pounds)... .... [1 9 6 0.]

*3. Fine Aggregate (Pounds). . .. . [1 2 0 7.]

*4 Cement (Pounds) . . . . [5 1 7.]

*5 Water (Pounds). . . .. [2 3 3.]

*6. TYPE CEMENT USED (See Cement Type Codes, Table A.11) [4 1]
(If Other, Specify _____)

*7. ALKALI CONTENT OF CEMENT, (PERCENT BY WEIGHT OF CEMENT) [0.5]
0.51

ADMIXTURES (PERCENT BY WEIGHT OF CEMENT)

		TYPE CODE	AMOUNT
*8.	ADMIXTURE #1	[0 x 1] $20.7\ oz/CY \times 1\ lb/16\ oz \times 1\ CY/537\ lb/CY\ cement \times 100$	[0.2 5 x 0]
*9	ADMIXTURE #2	[0 x 8] $1.5\ oz/CY \times 1\ lb/16\ oz \times 1\ CY/537\ lb/CY\ cement \times 100$	[0.0 1 x 8]
*10.	ADMIXTURE #3	[__.__]	[__ __ __.__]

(See Cement Admixture Codes, Table A.12)
(If Other, Specify) _____)

AGGREGATE DURABILITY TEST RESULTS
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

	TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
11.	Coarse	[__ __]	[__ __ __.__]
12.	Coarse	[__ __]	[__ __ __.__]
13.	Coarse	[__ __]	[__ __ __.__]
14.	Coarse and Fine	[__ __]	[__ __ __.__]

PREPARER Michael J. Farrell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 20 PORTLAND CEMENT CONCRETE LAYERS MIXTURE DATA (CONTINUED)	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

COMPOSITION OF COARSE AGGREGATE	TYPE	PERCENT
* 2.	[1]	[1 0 0.]
* 3.	[__]	[__ __ __.]
* 4	[__]	[__ __ __.]

Crushed Stone ... 1 Manufactured gravel. . 2 Crushed Gravel..... 3
Crushed Slag... . 4 Lightweight .. .. 5 Recycled Concrete . 6
Other (Specify)_____ 7

* 5 GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE DOLOMITIC LIMESTONE [0 9.]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE	TYPE	PERCENT
* 6.	[1]	[1 0 0.]
* 7.	[__]	[__ __ __.]
* 8.	[__]	[__ __ __.]

Natural Sand... 1
Crushed, Manufactured Sand (From Crushed Gravel or Stone)...2
Recycled Concrete... 3 Other (Specify)_____ 4

9. INSOLUBLE RESIDUE, PERCENT (ASTM D3042) [__ __ __.]

10. GRADATION OF COARSE AGGREGATE

Sieve Size	% Passing
2".. ...	1 0 0
1 1/2"....	1 0 0
1"....	__ __ __
7/8".....	__ __ __
3/4".....	7 7.6
5/8".....	__ __ __
1/2".....	2 8.7
3/8".....	__ __ __
No. 4.....	__ 1.5

11. GRADATION OF FINE AGGREGATE

3/8" 100
No. 4 99.7

Sieve Size	% Passing
No 8 ...	8 3.8
No. 10....	__ __ __
No. 16....	6 1.1
No. 30....	4 3.4
No. 40....	__ __ __
No. 50....	1 9.7
No. 80....	__ __ __
No. 100...	__ 3.4
No. 200...	__ 1.3

FM = 2.89

BULK SPECIFIC GRAVITIES:

12. Coarse Aggregate (AASHTO T85 or ASTM C127) [2.8 0 0]

13. Fine Aggregate (AASHTO T84 or ASTM C128) [2.5 9 7]

PREPARER Michael J. Farnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 21 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [1 2-0 7-9 9]

*2 DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [1 2-0 7-9 9]

*3 LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

*4 CONCRETE MIX PLANT AND HAUL

	Name	Haul Distance (Mi)	Time (Min)
Plant 1	KILLEEN READY-MIX	[9.5]	[2 0]
Plant 2		[ ]	[ ]
Plant 3		[ ]	[ ]

*5. PAVER TYPE [3]
Slip Form Paver ... 1 Side Form .. 2
Other (Specify) NONE 3

6. PAVER MANUFACTURER AND MODEL NUMBER N/A

7. SPREADER TYPE (if applicable) N/A

8. SPREADER MANUFACTURER AND MODEL NUMBER _____

9. WIDTH PAVED IN ONE PASS (Feet) [1 0.9]

10. DOWEL PLACEMENT METHOD [2]
Dowel Bar Inserter (DBI)..... 1 Dowel Basket.. .. 2

11. NUMBER OF VIBRATORS [ ]

12 VIBRATOR SPACING (Inches) [ ]

13. DEPTH OF VIBRATORS BELOW SURFACE (Inches) [.]

14. ADDITIONAL VIBRATION APPLIED _____

PREPARER Michael J. Farrell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 22 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA (CONTINUED)	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 7]

1. CONSOLIDATION OF MATERIALS [6]
   Internal Vibrators... 1 Vibrating Screeds... 2 Troweling... 3
   Rolling... 4 Tamping . 5
   Other (Specify)... 6 VIBRATING SCREED AND HAND-HELD IMMERSION VIBRATOR

2. FINISHING [2]
   Screeding... 1 Hand-Troweling... 2 Machine-Troweling. 3
   Other (Specify) .. 4 _____

3. CURING [1]

Membrane Curing Compound	1	Burlap-Polyethylene Blanket	5
Burlap Curing Blankets... . .	2	Cotton Mat Curing.	6
Waterproof Paper Blankets.....	3	Hay.	7
White Polyethylene Sheeting...	4		
Other (Specify)_____			8

4. TEXTURING [1]

Tine.....	1	Grooved Float.....	4
Broom.....	2	Astro Turf.....	5
Burlap Drag...	3	None.....	6
Other (Specify)_____			7

PREPARER Michael J. Darnell EMPLOYER FUGRO-BRE, INC. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 23 PORTLAND CEMENT CONCRETE SURFACE LAYER PROFILE DATA	* STATE CODE [4 8] * SPS PROJECT CODE [4 8] * TEST SECTION NO [0 7]

1. DATE PROFILE MEASURED (Month-Day-Year) [__ __-__ __-__ __]

2. PROFILOGRAPH TYPE California.. 1 Rainhart... 2 [___]

3. PROFILE INDEX (Inches/Mile) [___ ___]

4 INTERPRETATION METHOD Manual.. 1 Mechanical.. 2 Computer.. 3 [___]

5 HEIGHT OF BLANKING BAND (Inches) [___.___ ___]

6. CUTOFF HEIGHT (Inches) [___.___ ___]

7 SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO) [____]

8 WAS SURFACE PROFILE CORRECTED BY DIAMOND GRINDING? (YES, NO) [____]

IF YES COMPLETE THE FOLLOWING:

9. DATE DIAMOND GRINDING OPERATIONS BEGAN (Month-Day-Year) [__ __-__ __-__ __]

10. DATE DIAMOND GRINDING OPERATIONS COMPLETED (Month-Day-Year) [__ __-__ __-__ __]

*11. REASON FOR GRINDING [__]
Elimination of Faulting... 1 Elimination of Slab Warping... 2
Improve Skid Resistance... 3
Restoration of Transverse Drainage Slope. . 4
Correction of Construction Deficiencies.. 5
Other (Specify)... 6 _____

12 AVERAGE DEPTH OF CUT (Inches) [__ .__ __]

13. CUTTING HEAD WIDTH (Inches) [__ __ __ .__ __]

14. AVERAGE GROOVE WIDTH (Inches) [__ .__]

15. AVERAGE SPACING BETWEEN BLADES (Inches) [__.__]

PREPARER Michael J. Hanell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 1 PROJECT IDENTIFICATION	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [00]

*1. DATE OF DATA COLLECTION OR UPDATE (Month/Year) [02/00]

*2. STATE HIGHWAY AGENCY (SHA) DISTRICT NUMBER [09.]

*3. COUNTY OR PARISH [__27.]

4. FUNCTIONAL CLASS (SEE TABLE A.2, APPENDIX A) [09.]

*5. ROUTE SIGNING (NUMERIC CODE) FARM-TO-MARKET (FM) [4.]
Interstate... 1 U S... 2 State... 3
Other. . 4

*6 ROUTE NUMBER [__2670.]

7. TYPE OF PAVEMENT (01 for Granular Base, 02 for Treated Base) [01.]

8 NUMBER OF THROUGH LANES (ONE DIRECTION) [1.]

*9. DATE OF CONSTRUCTION COMPLETION (Month/Year) [01/00]

*10. DATE OPENED TO TRAFFIC (Month/Year) [01/00]

11. CONSTRUCTION COSTS PER LANE MILE (In $1000) [__1800.]

12. DIRECTION OF TRAVEL [1.]
East Bound... 1 West Bound... 2 North Bound... 3
South Bound... 4

PROJECT STARTING POINT LOCATION

*13. MILEPOINT [_____.__]

*14. ELEVATION [____804]

*15. LATITUDE [30° 58' 45.00"]

*16. LONGITUDE [__97° 46' 30.00"]

17. ADDITIONAL LOCATION INFORMATION (SIGNIFICANT LANDMARKS): [NEAR INTERSECTION OF FM 2670 AND TEXAS S.H. 195]

18. HPMS SAMPLE NUMBER (HPMS ITEM 28) [_____]

19. HPMS SECTION SUBDIVISION (HPMS ITEM 29) [__.]

PREPARER Michael J. Harrell EMPLOYER FUGRO-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 2 GEOMETRIC, SHOULDER AND DRAINAGE INFORMATION	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

*1. LANE WIDTH (FEET) [1 1.]

2 MONITORING SITE LANE NUMBER [1.]
(LANE 1 IS OUTSIDE LANE, NEXT TO SHOULDER
LANE 2 IS NEXT TO LANE 1, ETC.)

*3. SUBSURFACE DRAINAGE LOCATION [3.]
Continuous Along Test Section... 1 Intermittent... 2 None... 3

*4 SUBSURFACE DRAINAGE TYPE [1.]
No Subsurface Drainage... 1 Longitudinal Drains... 2
Transverse Drains. 3 Drainage Blanket 4 Well System. 5
Drainage Blanket with Longitudinal Drains 6
Other (Specify).. 7 _____

	SHOULDER DATA	INSIDE SHOULDER	OUTSIDE SHOULDER
*5.	SURFACE TYPE Turf... 1 Granular.... 2 Asphalt Concrete.. 3 Concrete. . 4 Surface Treatment... 5 Other (Specify)... 6 _____	[N.]	[5.]
*6.	TOTAL WIDTH (FEET)	[N.]	[4.]
*7.	PAVED WIDTH (FEET)	[N.]	[4]
8.	SHOULDER BASE TYPE (CODES-TABLE A.6)	[N.]	[2 3.]
9.	SURFACE THICKNESS (INCHES)	[N]	[0. 5]
10	SHOULDER BASE THICKNESS (INCHES)	[. N]	[6. 0]
11.	DIAMETER OF LONGITUDINAL DRAINPIPES (INCHES)		[N.]
12.	SPACING OF LATERALS (FEET)		[N.]

PREPARER Michael O. Darnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 3 REFERENCE PROJECT STATION TABLE	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [00]

ORDER	*1 TEST SECTION ID NO	REFERENCE PROJECT STATION NUMBER		*4 CUT-FILL[1] TYPE
		*2 START	*3 END	
1	48A807	0+00	5+00	3
2	48A808	6+06	11+06	3
3		+	+	
4		+	+	
5		+	+	
6		+	+	
7		+	+	
8		+	+	
9		+	+	
10		+	+	
11		+	+	
12		+	+	
13		+	+	
14		+	+	
15		+	+	
16		+	+	
17		+	+	
18		+	+	
19		+	+	
20		+	+	

*5 INTERSECTIONS BETWEEN TEST SECTION ON THE PROJECT

ROUTE	PROJECT STATION NO.	RAMPS EXIT	RAMPS ENT	INTERSECTION STOP	INTERSECTION SIGNAL	INTERSECTION UNSIG
	+__					
	+__					
	+__					

Note 1. Indicate the type of subgrade construction the test section is located on:
Cut... 1 Fill... 2 At-Grade... 3 Cut, Fill, and At-Grade Combo... 4

If a section contains any combination of cut, fill and at-grade portions (code 4 above), enter the specific details of the cut, fill and at-grade locations on SPS-8 Construction Data Sheet 15.

PREPARER Michael J. Farrell EMPLOYER FUGRO-BRE DATE 4/28/00

SPS-8 CONSTRUCTION DATA SHEET 4 LAYER DESCRIPTIONS	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

*1 LAYER NUMBER	*2 LAYER DESCRIPTION	*3 MATERIAL TYPE CLASS	*4 LAYER THICKNESSES (Inches)			
			AVERAGE	MINIMUM	MAXIMUM	STD. DEV.
1	SUBGRADE(7)	[5 1]				
2	[0 5]	[2 3]	[3.9]	0.0	5.9	1.5
3	[0 3]	[0 5]	[12.2]	10.9	14.3	0 9
4	[ ]	[ ]	[ ]			
5	[ ]	[ ]	[ ]			
6	[ ]	[ ]	[ ]			
7	[ ]	[ ]	[ ]			
8	[ ]	[ ]	[ ]			
9	[ ]	[ ]	[ ]			
10	[ ]	[ ]	[ ]			
11	[ ]	[ ]	[ ]			
12	[ ]	[ ]	[ ]			
13	[ ]	[ ]	[ ]			
14	[ ]	[ ]	[ ]			
15	[ ]	[ ]	[ ]			

*5 DEPTH BELOW SURFACE TO "RIGID" LAYER (FEET) [.]
(Rock, Stone, Dense Shale)

NOTES:

1. Layer 1 is the subgrade soil, the highest numbered layer is the pavement surface.

2. Layer description codes:

Overlay.....01	Base Layer.....05	Porous Friction Course..09
Seal/Tack Coat.....02	Subbase Layer.....06	Surface Treatment.....10
Original Surface.....03	Subgrade.....07	Embankment (Fill).....11
HMAC Layer (Subsurface).04	Interlayer.....08	

3. The material type classification codes are presented in Tables A.5, A.6, A.7 and A.8 of the Data Collection Guide for Long Term Pavement Performance Studies, dated January 17, 1990.

4. Enter the average thickness of each layer and the minimum, maximum and standard deviation of the thickness measurements, if known.

PREPARER Michael J. Darnell EMPLOYER FUGRO-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 12 LAYER THICKNESS MEASUREMENTS	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

SHEET 1 OF 2

STATION NUMBER	OFFSET (Inches)	LAYER THICKNESS MEASUREMENTS (Inches)			
		DENSE GRADED AGGREGATE BASE	PORTLAND CEMENT CONCRETE SURFACE	ASPHALT SURFACE AND BINDER	SURFACE FRICTION LAYER
0+00	4	07	13.7	— — —	— — —
	33	20	12.4	— — . —	— — . —
	65	18	12.5	— — . —	— — . —
	98	14	13.3	— — . —	— — —
	130	18	13.4	— — —	— — —
0+50	4	0.0	14.3	— — . —	— — . —
	33	1.4	12.7	— — . —	— — . —
	65	17	12.6	— — . —	— — . —
	98	1.9	12.6	— — . —	— — . —
	130	1.8	12.8	— — . —	— — . —
1+00	4	2.3	13.9	— — . —	— — . —
	33	4.6	12.1	— — . —	— — . —
	65	42	12.4	— — . —	— — . —
	98	4.1	12.4	— — . —	— — . —
	130	42	12.6	— — . —	— — . —
1+50	4	19	14.0	— — . —	— — . —
	33	3.6	12.7	— — . —	— — . —
	65	3.7	12.6	— — . —	— — . —
	98	32	13.1	— — . —	— — . —
	130	2.8	13.8	— — . —	— — . —
2+00	4	18	13.9	— — . —	— — . —
	33	2.8	12.7	— — . —	— — . —
	65	3.1	12.4	— — . —	— — . —
	98	2.4	13.0	— — . —	— — . —
	130	2.4	13.2	— — . —	— — . —
2+50	4	4.8	11.3	— — . —	— — . —
	33	4.7	11.2	— — . —	— — . —
	65	47	11.5	— — . —	— — . —
	98	5.0	11.4	— — . —	— — . —
	130	5.0	11.3	— — . —	— — . —
3+00	4	5.0	11.5	— — . —	— — . —
	33	5.2	11.5	— — . —	— — . —
	65	5.2	11.4	— — . —	— — . —
	98	5.3	11.5	— — . —	— — . —
	130	5.2	11.6	— — . —	— — . —
LAYER NUMBER		02	03	— —	— —

PREPARER Michael J. Hanel EMPLOYER FUGRO-BRE, INC. DATE 02/25/00

SPS-8 CONSTRUCTION DATA SHEET 12 LAYER THICKNESS MEASUREMENTS	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

SHEET 2 OF 2

STATION NUMBER	OFFSET (Inches)	LAYER THICKNESS MEASUREMENTS (Inches)			
		DENSE GRADED AGGREGATE BASE	PORTLAND CEMENT CONCRETE SURFACE	ASPHALT SURFACE AND BINDER	SURFACE FRICTION LAYER
3+50	4	5.2	11.4	.	.
	33	5.2	11.4	.	.
	65	5.4	11.6	.	.
	98	5.6	11.5	.	.
	130	5.9	11.5	.	.
4+00	4	5.2	11.2	.	.
	33	5.2	11.3	.	.
	65	5.3	11.2	.	.
	98	5.5	11.4	.	.
	130	5.4	11.8	.	.
4+50	4	4.4	10.9	.	.
	33	4.6	11.2	.	.
	65	4.4	11.0	.	.
	98	4.2	11.2	.	.
	130	4.2	11.4	.	.
5+00	4	5.9	11.6	.	.
	33	5.8	11.9	.	.
	65	5.5	11.9	.	.
	98	5.3	11.9	.	.
	130	4.7	12.1	.	.
+		.	.	.	.
		.	.	.	.
		.	.	.	.
		.	.	.	.
		.	.	.	.
+		.	.	.	.
		.	.	.	.
		.	.	.	.
		.	.	.	.
		.	.	.	.
+		.	.	.	.
		.	.	.	.
		.	.	.	.
		.	.	.	.
		.	.	.	.
LAYER NUMBER		02	03		

PREPARER *Michael J. Hanell* EMPLOYER *Fugro-BRE, Inc.* DATE *02/15/00*

SPS-8 CONSTRUCTION DATA SHEET 13 UNBOUND AGGREGATE BASE MATERIAL PLACEMENT	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

*1. UNBOUND BASE MATERIAL PLACEMENT BEGAN (Month-Day-Year) [1 1-1 7-9 9]

*2. UNBOUND BASE MATERIAL PLACEMENT COMPLETED (Month-Day-Year) [1 2-0 1-9 9]

*3. LAYER NUMBER (From Sheet 4) [2]

PRIMARY COMPACTION EQUIPMENT

*4. CODE TYPE [1]

COMPACTION TYPE CODES
Pneumatic - Tired 1 Steel Wheel Tandem . 2 Single Drum Vibr .. 3
Double Drum Vibr . 4
Other (Specify)... 5 _____

*5. GROSS WEIGHT (TONS) [1 2.0]

*6. LIFT THICKNESSES
Nominal First Lift Placement Thickness (inches) [0 6]
Nominal Second Lift Placement Thickness (inches) [__ __]
Nominal Third Lift Placement Thickness (inches) [__ __]
Nominal Fourth Lift Placement Thickness (inches) [__ __]

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

7. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____

PREPARER Michael J. Hamell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 14 SUBGRADE PREPARATION	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

*1. SUBGRADE PREPARATION BEGAN (Month-Day-Year) [1 1-0 9-9 9]

*2 SUBGRADE PREPARATION COMPLETED (Month-Day-Year) [1 1-1 6-9 9]

PRIMARY COMPACTION EQUIPMENT

*3. CODE TYPE [1]

COMPACTION EQUIPMENT TYPE CODES
Sheepsfoot... 1 Pneumatic Tired... 2 Steel Wheel Tandem 3
Single Drum Vibr ... 4 Double Drum Vibr . 5
Other (Specify)... 6 _____

*4. GROSS WEIGHT (TONS) [1 3 8]

	TYPE	PERCENT
*5. STABILIZING AGENT 1	[__]	[__ __.__]
*6. STABILIZING AGENT 2	[__]	[__ __.__]

STABILIZING AGENT TYPE CODES
Portland Cement... 1 Lime .. 2 Fly Ash, Class C... 3
Fly Ash, Class N... 4
Other (Specify).. 5 _____

*7. TYPICAL LIFT THICKNESS (INCHES) [__ __]
(For Fill Sections Only)

DENSITY DATA IS RECORDED ON SAMPLING DATA SHEET 8-1

8. SIGNIFICANT EVENTS DURING CONSTRUCTION (DISRUPTIONS, RAIN, EQUIPMENT PROBLEMS, ETC.) _____

PREPARER Michael J Farrell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 15 CUT-FILL SECTION LOCATIONS	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

ORDER	*1 CUT-FILL TYPE[1]	TEST SECTION STATION NUMBER	
		*2 START	*3 END
1	3	0 + 0 0	5 + 0 0
2		+	+
3		+	+
4		+	+
5		+	+
6		+	+
7		+	+
8		+	+
9		+	+
10		+	+

NOTES:

1. Indicate the type of subgrade construction with one of the following:

   Cut... 1 Fill... 2 At-Grade... 3

2. Use one line for each cut, fill or at-grade zone present within the section boundaries.

PREPARER Michael J. Bemell EMPLOYER FUGRO-BRE, INC. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 16 SUBGRADE EXCAVATION AND BACKFILLING SKETCH	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

NOT APPLICABLE

PREPARER Michael J. Farrell EMPLOYER FUGRO-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 17 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

* 2 AVERAGE CONTRACTION JOINT SPACING (Feet) [1 5.0]

3. (RANDOM JOINT SPACING, IF ANY _____)

* 4. SKEWNESS OF JOINTS (ft/lane) [.N]

* 5. TRANSVERSE CONTRACTION JOINT LOAD TRANSFER SYSTEM [1]
- Round Dowels 1
- Aggregate Interlock 2
- Other (Specify) _____ 3

* 6 ROUND DOWEL DIAMETER (Inches) [1.2 5]

* 7 DOWEL SPACING (Inches) [1 2.]

8. DISTANCE OF NEAREST DOWEL FROM OUTSIDE LANE-SHOULDER EDGE (Inches) [5.5]

9 DOWEL LENGTH (Inches) [1 8.]

10. DOWEL COATING [5]
- Paint and/or Grease 1
- Plastic 2
- Monel 3
- Stainless Steel 4
- Epoxy 5
- Other (Specify) _____ 6

11. METHOD USED TO INSTALL MECHANICAL LOAD TRANSFER DEVICES [1]
- Preplaced on Baskets 1
- Mechanically Installed 2
- Other (Specify) _____ 3

12. DOWEL ALIGNMENT CHECKED BEFORE PLACEMENT (Y/N) [Y]

13. DOWEL ALIGNMENT CHECKED AFTER PLACEMENT (Y/N) [N]

If Yes, describe method used _____
(e.g. Pachometer, Ground Penetrating Radar)

PREPARER Michael J. Hanell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 18 PORTLAND CEMENT CONCRETE LAYERS-JOINT DATA (CONTINUED)	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [08]

* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

* 2. METHOD USED TO FORM TRANSVERSE JOINTS [1]
Sawed..... 1 Metal Insert.. 3
Plastic Insert.. 2
Other (Specify) _____ 4

* 3. TYPE OF LONGITUDINAL JOINT (BETWEEN LANES) [1]
Butt..... 1 Insert Weakened Plane . . 3
Sawed Weakened Plane.. 2
Other (Specify) _____ 4

* 4 TYPE OF SHOULDER-TRAFFIC LANE JOINT [4]
Butt..... 1 Insert Weakened Plane . . 3
Sawed Weakened Plane .. 2
Other (Specify) NONE, SHOULDER SURFACE TREATMENT ONLY 4

*5. AVERAGE DEPTH OF SAWCUT, FROM MEASUREMENTS (Inches)... 3 3/16" ..... [3.19]

*6. TIME INTERVAL BETWEEN CONCRETE PLACEMENT AND SAWCUT (HOURS)..... [24]

7 TRANSVERSE JOINT SEALANT TYPE (AS BUILT) [4]
Preformed (Open Web).. 1 Rubberized Asphalt..... 3
Asphalt .. 2 Low-Modulus Silicone. 4
Other (Specify) _____ 5

TRANSVERSE JOINT SEALANT RESERVOIR (AS BUILT)

8. WIDTH, (Inches)... 3/8"... [0.38]

9. DEPTH, (Inches)... 1 3/4"... [1.75]

LONGITUDINAL JOINT SEALANT RESERVOIR (AS BUILT)

10. WIDTH, (Inches)... [0.38]

11. DEPTH, (Inches)... [1.75]

12. BETWEEN LANE TIE BAR DIAMETER (Inches) #5 [0.63]

13. BETWEEN LANE TIE BAR LENGTH (Inches) [40.]

14. BETWEEN LANE TIE BAR SPACING (Inches) [390]

SHOULDER-TRAFFIC LANE JOINT SEALANT RESERVOIR (AS BUILT)

15. WIDTH, (Inches)... NONE ... [N.__ __]

16. DEPTH, (Inches)... NONE ... [N.__ __]

PREPARER Michael J. Darnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 19 PORTLAND CEMENT CONCRETE LAYERS - MIXTURE DATA	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

*1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

MIX DESIGN (OVEN DRIED WEIGHT - PER CUBIC YARD)

*2 Coarse Aggregate (Pounds) . . . . . [1960.]

*3. Fine Aggregate (Pounds) . . . . . [1207.]

*4. Cement (Pounds) . . . . . [517.]

*5. Water (Pounds) . . . . . [233.]

*6 TYPE CEMENT USED (See Cement Type Codes, Table A 11) [41]
(If Other, Specify _____)

*7. ALKALI CONTENT OF CEMENT, (PERCENT BY WEIGHT OF CEMENT) [0.5]
0.51

ADMIXTURES (PERCENT BY WEIGHT OF CEMENT)

		TYPE CODE	AMOUNT
*8.	ADMIXTURE #1	[01] $20.7\ oz/CY \times \frac{1\ lb}{16\ oz} \times \frac{1\ CY}{517\ lb/CY\ cement} \times 100$	[0.250]
*9.	ADMIXTURE #2	[08] $1.5\ oz/CY \times \frac{1\ lb}{16\ oz} \times \frac{1\ CY}{517\ lb/CY\ cement} \times 100$	[0.018]
*10.	ADMIXTURE #3	[__.__]	[_____.__]

(See Cement Admixture Codes, Table A.12)
(If Other, Specify) _____)

AGGREGATE DURABILITY TEST RESULTS
(SEE DURABILITY TEST TYPE CODES, TABLE A.13)

	TYPE OF AGGREGATE	TYPE OF TEST	RESULTS
11.	Coarse	[__ __]	[_____.__]
12.	Coarse	[__ __]	[_____.__]
13.	Coarse	[__ __]	[_____.__]
14.	Coarse and Fine	[__ __]	[_____.__]

PREPARER Michael J. Darnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 20 PORTLAND CEMENT CONCRETE LAYERS MIXTURE DATA (CONTINUED)	* STATE CODE [48] * SPS PROJECT CODE [A8] * TEST SECTION NO. [08]

* 1. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

COMPOSITION OF COARSE AGGREGATE	TYPE	PERCENT
* 2	[1]	[100.]
* 3.	[__]	[___.]
* 4	[__]	[___.]

Crushed Stone.. . 1 Manufactured gravel.. . . 2 Crushed Gravel 3
Crushed Slag..... 4 Lightweight 5 Recycled Concrete. . 6
Other (Specify)_____ 7

* 5. GEOLOGIC CLASSIFICATION OF COARSE AGGREGATE DOLOMITIC LIMESTONE [09]
(SEE GEOLOGIC CLASSIFICATION CODES, TABLE A.9)

COMPOSITION OF FINE AGGREGATE	TYPE	PERCENT
* 6.	[1]	[100.]
* 7.	[__]	[___.]
* 8.	[__]	[___.]

Natural Sand. . 1
Crushed, Manufactured Sand (From Crushed Gravel or Stone)...2
Recycled Concrete... 3 Other (Specify)_____ 4

9. INSOLUBLE RESIDUE, PERCENT (ASTM D3042) [___.]

10. GRADATION OF COARSE AGGREGATE

Sieve Size	% Passing
2".....	100
1 1/2"....	100
1".....	___
7/8".....	___
3/4".....	77.6
5/8".....	___
1/2".....	28.7
3/8".....	___
No. 4.....	1.5

11 GRADATION OF FINE AGGREGATE

Sieve Size	% Passing
3/8"	100
No. 4	99.7
No. 8.....	83.8
No. 10....	___
No. 16....	61.1
No. 30....	43.4
No. 40....	___
No. 50....	19.7
No. 80....	___
No. 100...	3.4
No. 200...	1.3

FM = 2.89

BULK SPECIFIC GRAVITIES:

12. Coarse Aggregate (AASHTO T85 or ASTM C127) [2.800]

13. Fine Aggregate (AASHTO T84 or ASTM C128) [2.597]

PREPARER Michael J. Darnell EMPLOYER FUGRO-BRE, INC. DATE 12/15/00

SPS-8 CONSTRUCTION DATA SHEET 21 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

*1. DATE PAVING OPERATIONS BEGAN (Month-Day-Year) [12-14-99]

*2 DATE PAVING OPERATIONS COMPLETED (Month-Day-Year) [12-15-99]

*3. LAYER NUMBER (FROM CONSTRUCTION DATA SHEET 4) [3]

*4. CONCRETE MIX PLANT AND HAUL

	Name	Haul Distance (Mi)	Time (Min)
Plant 1	KILLEEN READY-MIX	[9.5]	[20]
Plant 2		[ ]	[ ]
Plant 3		[ ]	[ ]

*5. PAVER TYPE [3]
Slip Form Paver. .. 1 Side Form. . 2
Other (Specify) NONE 3

6. PAVER MANUFACTURER AND MODEL NUMBER N/A

7. SPREADER TYPE (if applicable) N/A

8. SPREADER MANUFACTURER AND MODEL NUMBER

9. WIDTH PAVED IN ONE PASS (Feet) [10.8]

10 DOWEL PLACEMENT METHOD [2]
Dowel Bar Inserter (DBI). ... 1 Dowel Basket..... 2

11. NUMBER OF VIBRATORS [ ]

12. VIBRATOR SPACING (Inches) [ ]

13. DEPTH OF VIBRATORS BELOW SURFACE (Inches) [.]

14. ADDITIONAL VIBRATION APPLIED

PREPARER Michael J. Darnell EMPLOYER FIGRO - BRE, Inc. DATE 02/25/00

SPS-8 CONSTRUCTION DATA SHEET 22 PORTLAND CEMENT CONCRETE LAYERS PLACEMENT DATA (CONTINUED)	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO. [0 8]

1. CONSOLIDATION OF MATERIALS [2] 16

Internal Vibrators... 1 Vibrating Screeds .. 2 Troweling 3
Rolling... 4 Tamping.. 5
Other (Specify). . 6 HAND-HELD IMMERSION VIBRATOR

2 FINISHING [2]

Screeding . 1 Hand-Troweling . 2 Machine-Troweling 3
Other (Specify)... 4 _____

3. CURING [1]

Membrane Curing Compound . .	1	Burlap-Polyethylene Blanket .	5
Burlap Curing Blankets... .	2	Cotton Mat Curing.	6
Waterproof Paper Blankets. .	3	Hay .. . . ;....	7
White Polyethylene Sheeting .	4		
Other (Specify)_____			8

4. TEXTURING [1]

Tine.....	1	Grooved Float.....	4
Broom.....	2	Astro Turf	5
Burlap Drag.....	3	None.....	6
Other (Specify)_____			7

PREPARER Michael J. Darnell EMPLOYER Fugro-BRE, Inc. DATE 02/15/00

SPS-8 CONSTRUCTION DATA SHEET 23 PORTLAND CEMENT CONCRETE SURFACE LAYER PROFILE DATA	* STATE CODE [4 8] * SPS PROJECT CODE [A 8] * TEST SECTION NO [0 8]

1. DATE PROFILE MEASURED (Month-Day-Year) [__ __ - __ __ - __ __]

2. PROFILOGRAPH TYPE California . 1 Rainhart. . 2 [___]

3 PROFILE INDEX (Inches/Mile) [___ ___]

4. INTERPRETATION METHOD Manual . 1 Mechanical. 2 Computer . 3 [___]

5 HEIGHT OF BLANKING BAND (Inches) [___ ___ ___]

6. CUTOFF HEIGHT (Inches) [___ ___ ___]

7 SURFACE PROFILE USED AS BASIS OF INCENTIVE PAYMENT? (YES, NO) [____]

8. WAS SURFACE PROFILE CORRECTED BY DIAMOND GRINDING? (YES, NO) [____]

IF YES COMPLETE THE FOLLOWING.

9. DATE DIAMOND GRINDING OPERATIONS BEGAN (Month-Day-Year) [__ __-__ __-__ __]

10. DATE DIAMOND GRINDING OPERATIONS COMPLETED (Month-Day-Year) [__ __-__ __-__ __]

*11. REASON FOR GRINDING [__]
Elimination of Faulting.. 1 Elimination of Slab Warping. . 2
Improve Skid Resistance... 3
Restoration of Transverse Drainage Slope... 4
Correction of Construction Deficiencies...5
Other (Specify)... 6 _____

12. AVERAGE DEPTH OF CUT (Inches) [__ .__ __]

13. CUTTING HEAD WIDTH (Inches) [__ __ __ .__ __]

14. AVERAGE GROOVE WIDTH (Inches) [__ .__]

15. AVERAGE SPACING BETWEEN BLADES (Inches) [__.__]

PREPARER Michael J. Harnell EMPLOYER FUGRO-BRE, Inc. DATE 02/15/00

APPENDIX E

PHOTOGRAPHS

Photo 1. Finished Subgrade and Shoulder Construction, 11 November 1999

Photo 2. Shoulder Auger and Plate Load Test Setup, 12 November 1999

Photo 3. Finished Dense Graded Aggregate (DGAB) Base, 19 November 1999

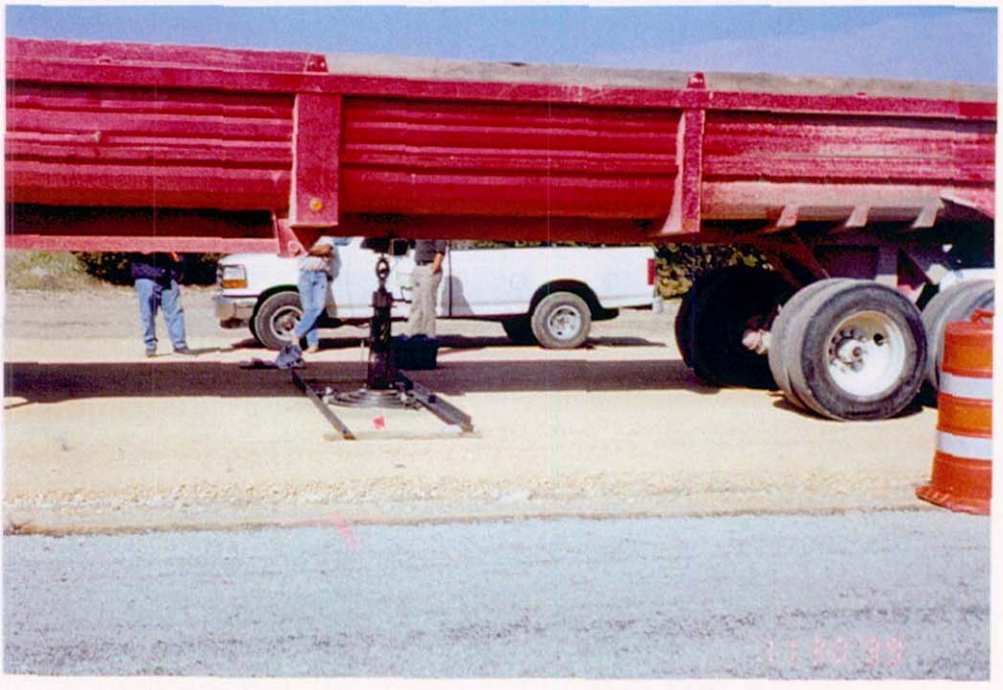


Photo 4. Plate Load Test Conducted on DGAB Layer, 30 November 1999

Photo 5: Killeen Ready-Mix Concrete Plant

Photo 6: Concrete Pour on 48A808

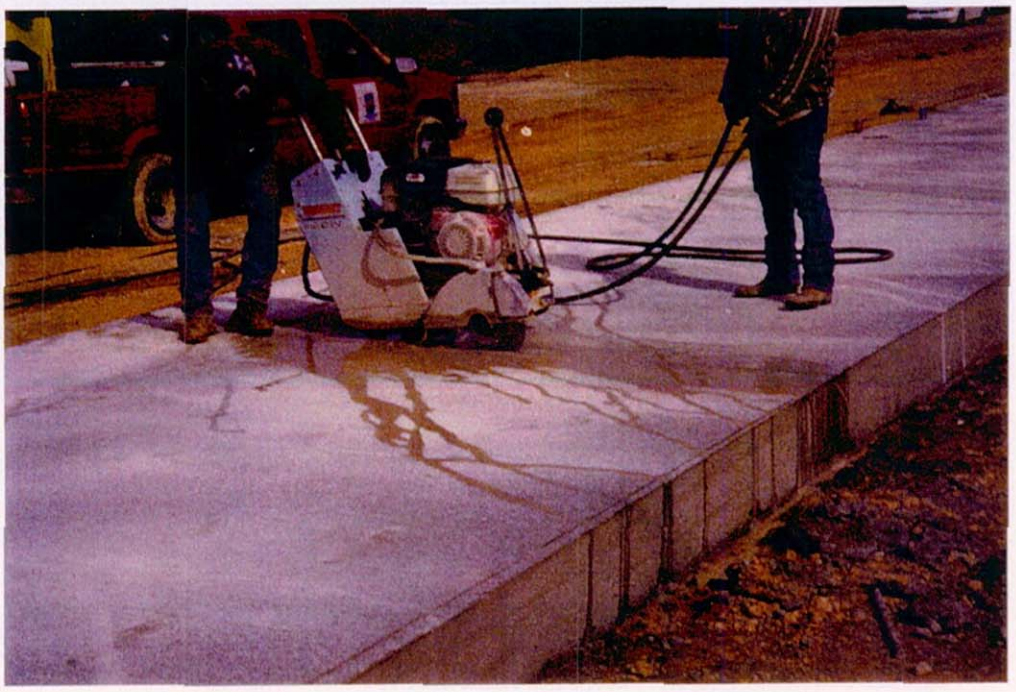


Photo 7. Joint Sawing

Photo 8. Concrete Pour East of 48A808 to Connect to Existing Pavement

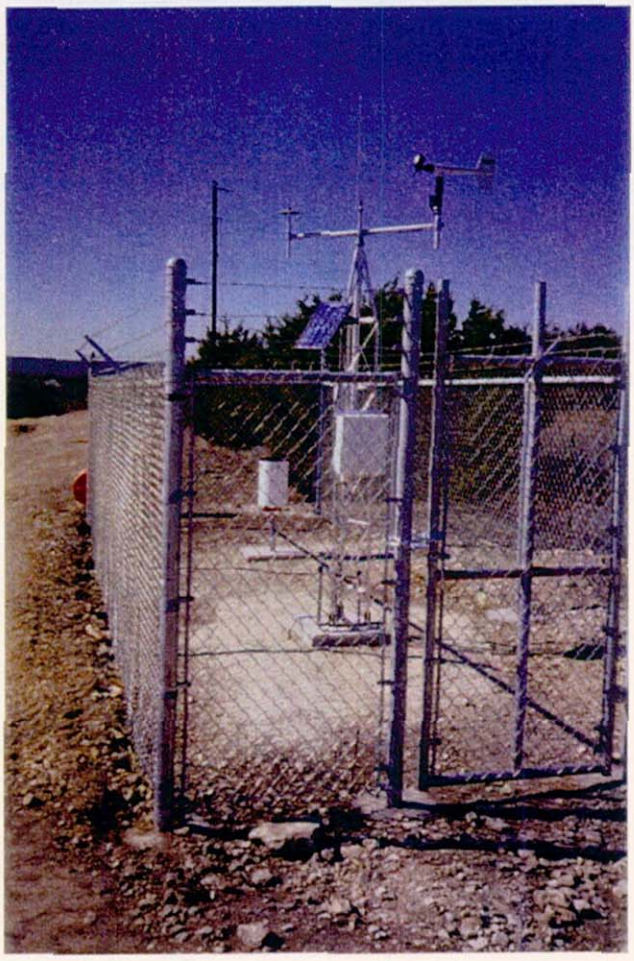


Photo 9. Automated Weather Station (AWS)

Photo 10. Concrete Core C-10 Removed.